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Vol. XI., No. 3. SHANGHAI - MANILA August, 1914.

THE DEVELOPMENT OF DAIREN

RAILWAY WORKSHOPS AT SHAKAKO

THE HWAI RIVER FLOOD REGION

OPERATIONS OF THE RED CROSS COMMISSION

THE PROTECTORATE OF KIAOCHOU

VIEWS OF THE BELEAGUERED CITY OF TSINGTAO

THE WAR AND CHINA

AN ANALYSIS OF CHINA'S FOREIGN TRADE

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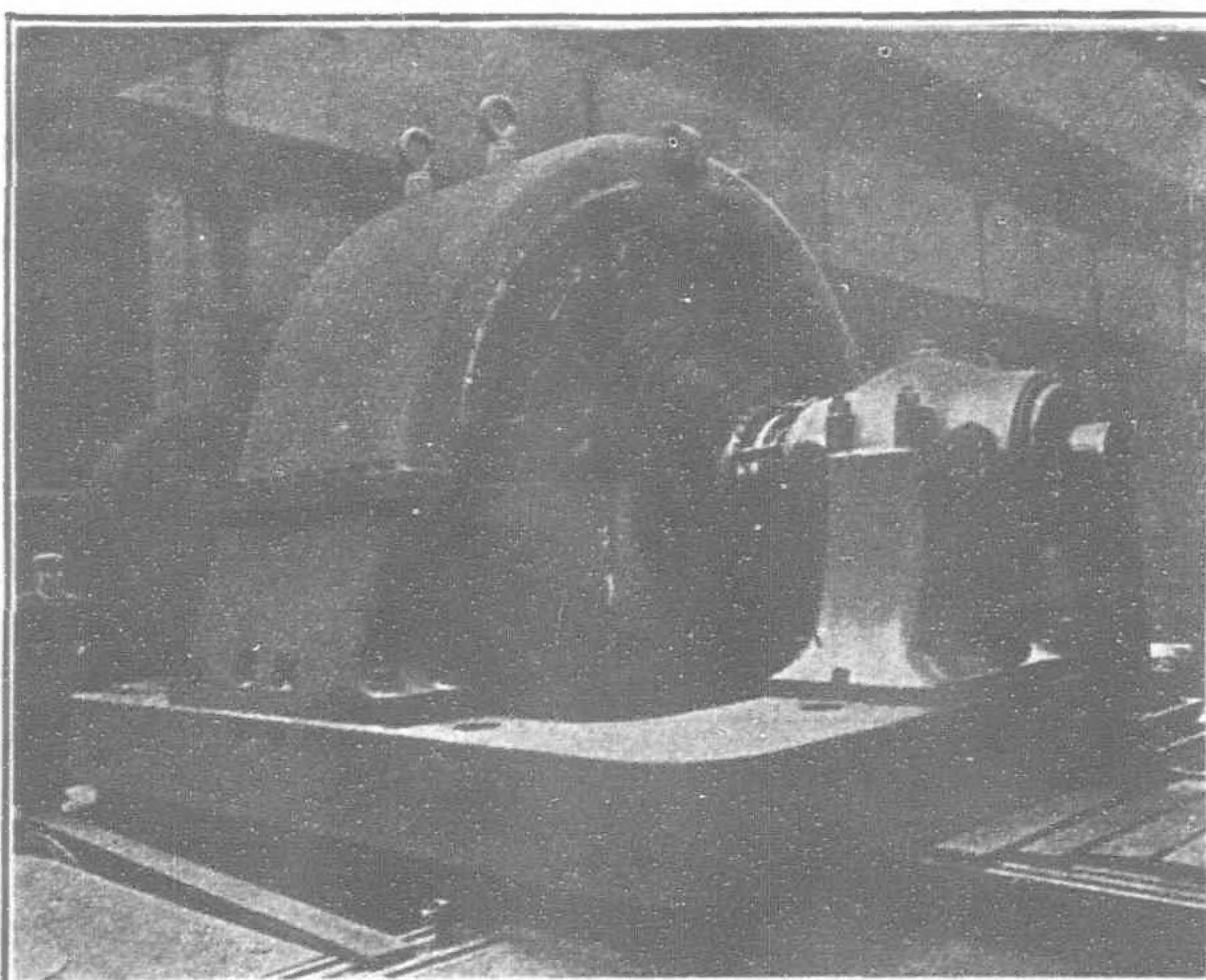
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THE FAR EASTERN REVIEW

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No. 3

THE DEVELOPMENT OF DAIREN

ACTIVITIES OF THE SOUTH MANCHURIA RAILWAY

A visit to Dairen, Tairen, Tailen, Dalny or Dalni—as the port of the Japanese Leased Territory of Kwangtung is variously called—by anyone whose previous acquaintance with the town dated a decade back, would induce wonder and not a little admiration. The soul that animates Dairen is the South Manchuria Railway Company. In every direction signs of its activity are to be seen. Is it the huge million yen Yamato Hotel? By whom constructed and by whom to be operated? The South Manchuria Railway Company or Mantetsu, to give it its Japanese name! Is it the magnificent Shinto Temple now being constructed, the immense Railway Workshops at Shakako, the Schools, the Central Laboratory, the Hospitals, the Experimental Bean Mill, the Tramways, the sea-side resort at Hoshigaura, the Electric Light Plant, etc., all were brought into existence by this great railway company, which is one of the proudest monuments of Japan's organizing powers.

The South Manchuria Railway Company is a child of war. It will be remembered that at the conclusion of the Russo-Japanese War in 1905 by the Treaty of Portsmouth Japan acquired the railway through Manchuria from Changchun to Dalny and Port Arthur and all the branch lines, coal mines, etc.

Japan also acquired all the rights formerly held by Russia in the railway zone and in the leased territory. The South Manchuria Railway Company was formally established on November 13, 1906 with Baron S. Goto as President. When he became Minister of Communications in July 1908 Mr. Z. Nakamura succeeded him as President of the Company and retained the position until the end of 1913 when he was succeeded by Dr. Nomura. The latter was retired by the Government in July, 1914 and Lieut.-General Baron Nakamura appointed in his stead.

The capital of the Company is Y200,000,000 of which the Japanese Government owns half. The amount of capital actually paid up to date is Y.60,000,000. The share of the Japanese Government is the assessed value of the railway lines, coal mines

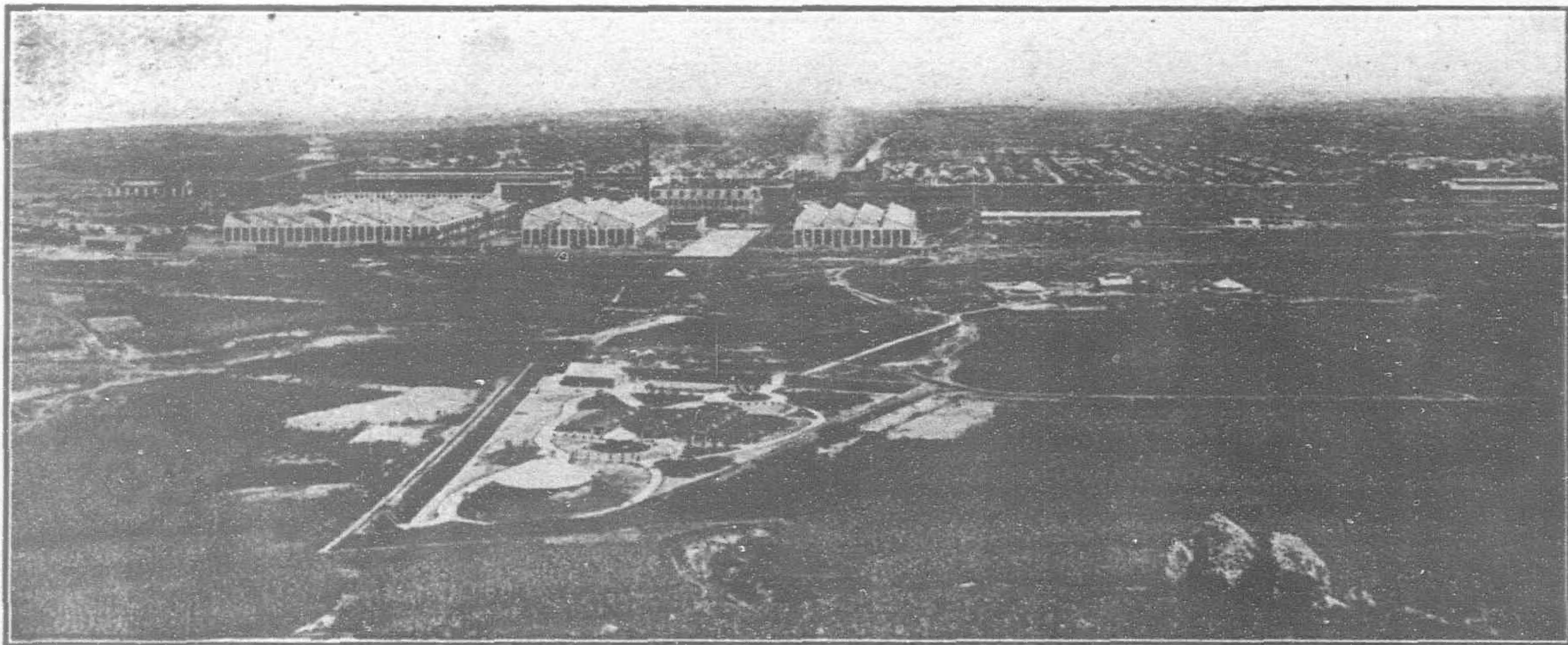
and other properties and rights acquired from Russia and handed over to the Company. Debentures to the value of Y117,156,000 have been issued.

The gauge of the main railway and branches when taken over was 3 feet 6 inches and the gauge of the Mukden-Antung line was 2 feet 8 inches. By June, 1908 the entire main line and the Fushun and Yingkou branches had been transformed to the standard gauge. The work of transforming the Mukden-Antung line to the standard gauge was begun in August, 1909 and was completed in November, 1911.

Adequately to deal with the numerous enterprises of the Company in a single article would be impossible, and we propose therefore to confine ourselves for the present to the Shakako Railway Works.

The Shakako Railway Workshops

The official opening of the workshop took place on November 23, 1911 when the leading residents and Government Officials of Dairen and Port Arthur were present. Mr. Z. Nakamura, the President, and Mr. S. Kunisawa, the Vice-President of the Railway Company, delivered opening addresses, and Mr. M. Yo-



General View of Shakako

shino, the Chief Mechanical Engineer, submitted a report on the progress of the workshops from the first cutting of the sod, to their completion, from which we take the following extract:—

"The work of levelling up the ground was started in July, 1908. The foundation work of the Locomotive and Machine Shop and the Smith Shop was commenced in the following November. The erection of the steel structures for these shops was started in May of the following year and progressed satisfactorily.

"In January 1910, I was sent to England to place orders for the building materials for the remaining 8 large and 5 small buildings, and their main equipments.

"These materials were forwarded to Dairen with the utmost despatch, the first delivery arriving on board the S.S. "Promosius" in May of that year. The delivery was accomplished by 20 boats, the last of which arrived in August of 1911.

"The foundations for these buildings were laid down consecutively, the first being started in June and the last in December. It is a noteworthy fact that this foundation work was carried on through the rigour of winter, without a break—an unprecedented feat in this country, where the generally accepted idea has hitherto been that such foundation work could not be carried out during the winter months.

"Temporary stoppages were made in the progress on certain days when the work was threatened by an unusually severe frost, in order to cover up and protect the work.

"One by one the structures for the buildings were erected, beginning in August of last year (1910); as progress was made with each building, its equipments were installed.

"The whole enterprise was completed towards the end of last month (October 1911). The total expenditure was Gold Yen 4,387,437.017.

4 miles from Dairen (the starting point of the South Manchuria Railway) adjacent to the main line.

The area of the total enclosure of workshops and colony, is about 400 acres.

The workshops are laid out over an area of about 200 acres; the gross total area of the workshop buildings being a little less than 11 acres.

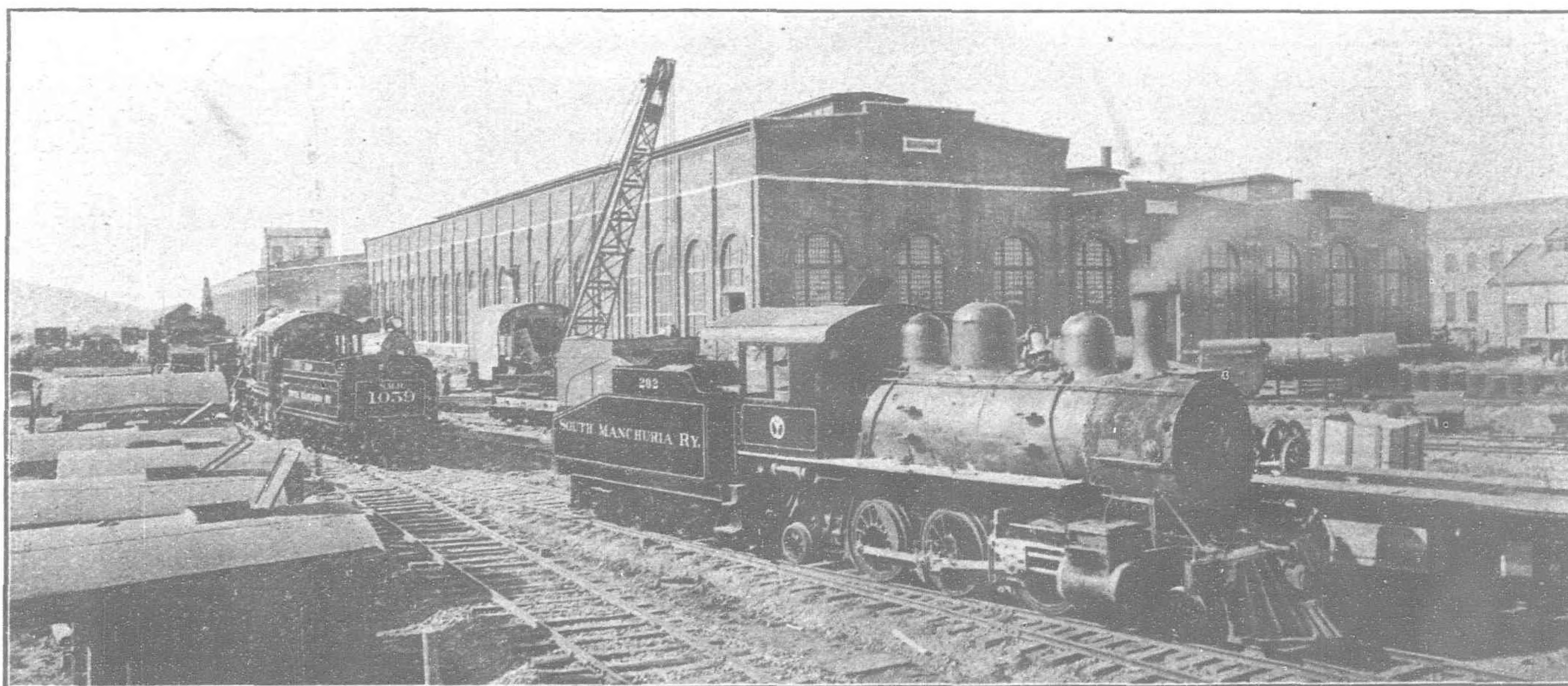
The Lay-Out comprises: — Locomotive and Machine Shop, Boiler Shop, Smith Shop, Foundry, Pattern Shop and Pattern and Foundry Stores, Power House, General Stores, Oil and Rubber Stores, Truck, Wheel and Brake Shop, Wood Mill and Freight Car Shop, Cabinet, Upholstering and Passenger Car Shop, Paint

Shop, Timber Store, Timber Drying Kiln, Train Lighting Equipment Repairing House, Cleaning Pit House, Locomotive Weighing and Preparation Shed, Testing Laboratories, Fire Brigade and Night Watch's Station, Pumping Station, a 70 ft. Turntable, a 75 ft. Traverser and the General Office.

The Colony covers an area of about 200 acres. There have been built, 695 houses for the staff and workpeople employed at the workshops, 12 houses for the use of tradesmen, a Hospital,



The Administration Building and Offices.



View of the Workshops.

"The capacity of the completed workshops is such as to deal, at any one time, with the repair of about 27 Locomotives, 36 Carriages, and 130 Goods Cars.

"Even at this early date, there has already been made and turned out, a total of 3 First-Class and Dining Cars, 3 First-Class and Baggage Cars, 3 Baggage and Mail Cars for use on the Mukden-Corean Express Mail Train service and 17 Tram Cars, while 3 Sleeping Cars are at the present moment fast approaching completion."

The Workshops and Colony are situated at Shakako, about

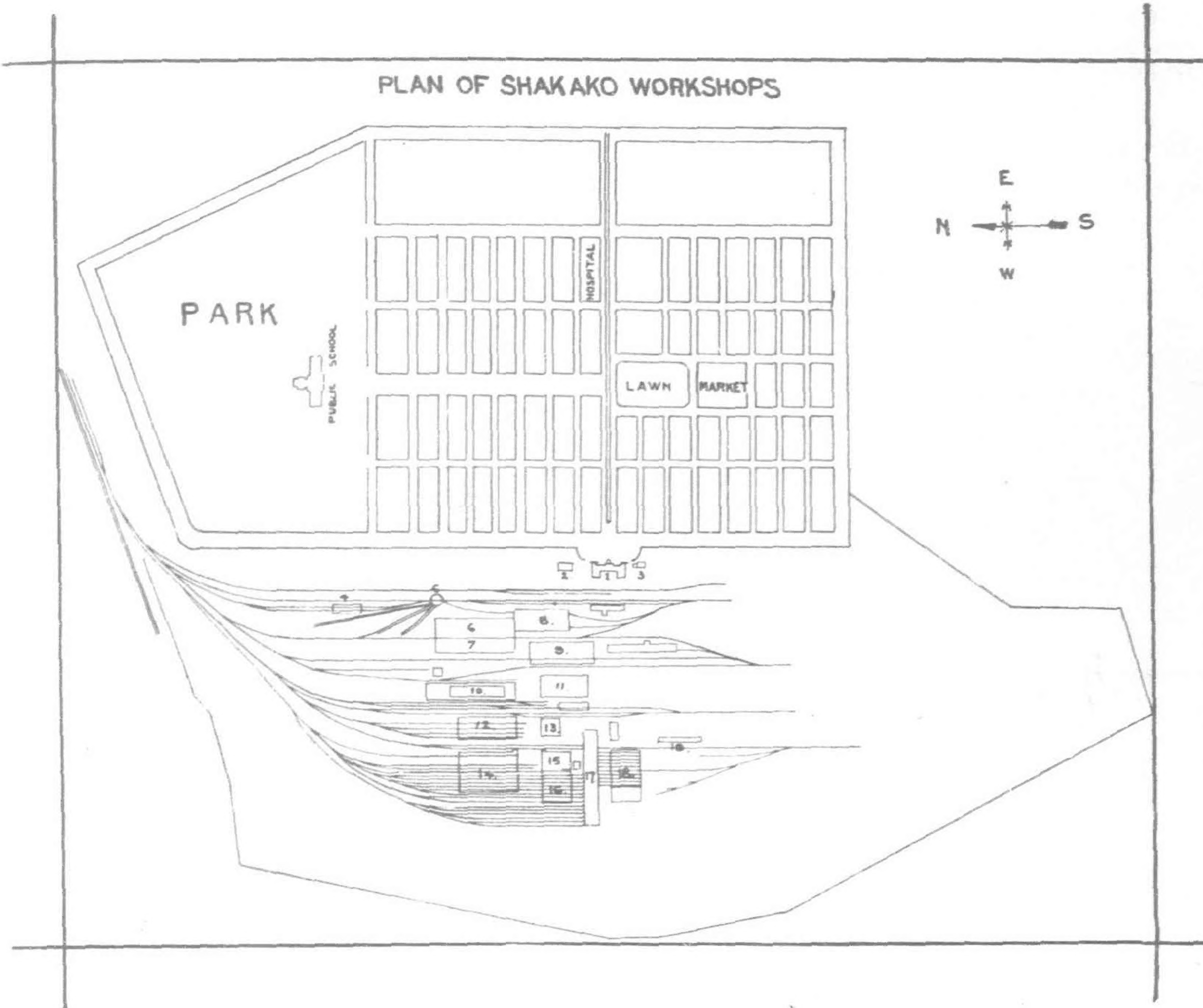
Children's School, Post and Telegraph Office, 3 small Public Baths and a Club-House.

All houses are lighted by electricity, and the better class houses have a hot water heating system installed. The water supply and drainage system has received careful attention, and has been well carried out.

The Electric Tramway from Dairen extends through the main road of the Colony, with its terminus in front of the main office building.

The Colony has a population, of about 2,600 Japanese.

PLAN OF SHAKAKO WORKSHOPS



This plan shows in the upper portion the town built by the Administration for the Workshops employees. A tram line, connecting with the main Dairen service, runs through the centre of the town. The key to the plan is as follows 1.—Administration Building, 2.—Testing Laboratory, 3.—Fire Brigade, 4.—Locomotive Weighing Shop, 5.—Turntable, 6.—Engine Repair Shop, 7.—Machine Shop, 8.—Boiler Shop, 9.—Smith Shop, 10.—General Stores, 11.—Foundry, 12.—Air Brake and Truck Repair Shop, 13.—Power House, 14.—Wood Mill and Freight Car Repair Shop, 15.—Cabinet Shop, 16.—Passenger Car Shop, 17.—Transfer Table, 18.—Paint Shop, 19.—Timber Store.

Ground Plan of the Workshops.—For so large a plant, the arrangement is very compact. The plan has been so drawn up as to group work of a similar character together, in order to minimise the distance through which materials and parts must be carried. Care has also been taken to provide everywhere for straight line movement of materials.

The buildings are spaced a sufficient distance apart to allow of good natural lighting.

The General Office is in the fore-ground of the lay-out, with its frontage east, and opposite the end of the main road through the Colony. The Testing Laboratories are 110'-0" to the north of the General Office, and the Fire Brigade and Night Watch's Station is 70'-0" to the south. The entrance for the workpeople is through turnstiles situated between the General Office and the latter station.

The Locomotive and Machine Shop is situated at the northeast corner of the group. The Boiler Shop is behind this at its south-east end, its main bay forming a continuation of the Locomotive Shop. The Smith

Shop is 60'-0" west of the Boiler Shop, and 80'-0" south of the Machine Shop.

The Foundry is 60'-0" west of the Smith Shop, the Pattern Shop and Pattern and Foundry Stores being adjacent at its southwest corner.

The Power House, which is situated in a central position to the entire lay-out, is 115'-0" west of the Foundry, and has its north end in line with the north end of the Foundry.

The Cabinet, Upholstering and Passenger Car Shop is 90'-0" to the west of the Power House, with its north end in line with the north ends of the Power House and Foundry.

The Paint Shop is 220'-0" south of the Cabinet, Upholstering and Passenger Car Shop. The Timber Drying Kiln is situated 54'-5" to the east of the Paint Shop, in line with its north end.

The Electric Train-Lighting Equipment Repairing House is built close up to the south end of the Passenger Car Shop.

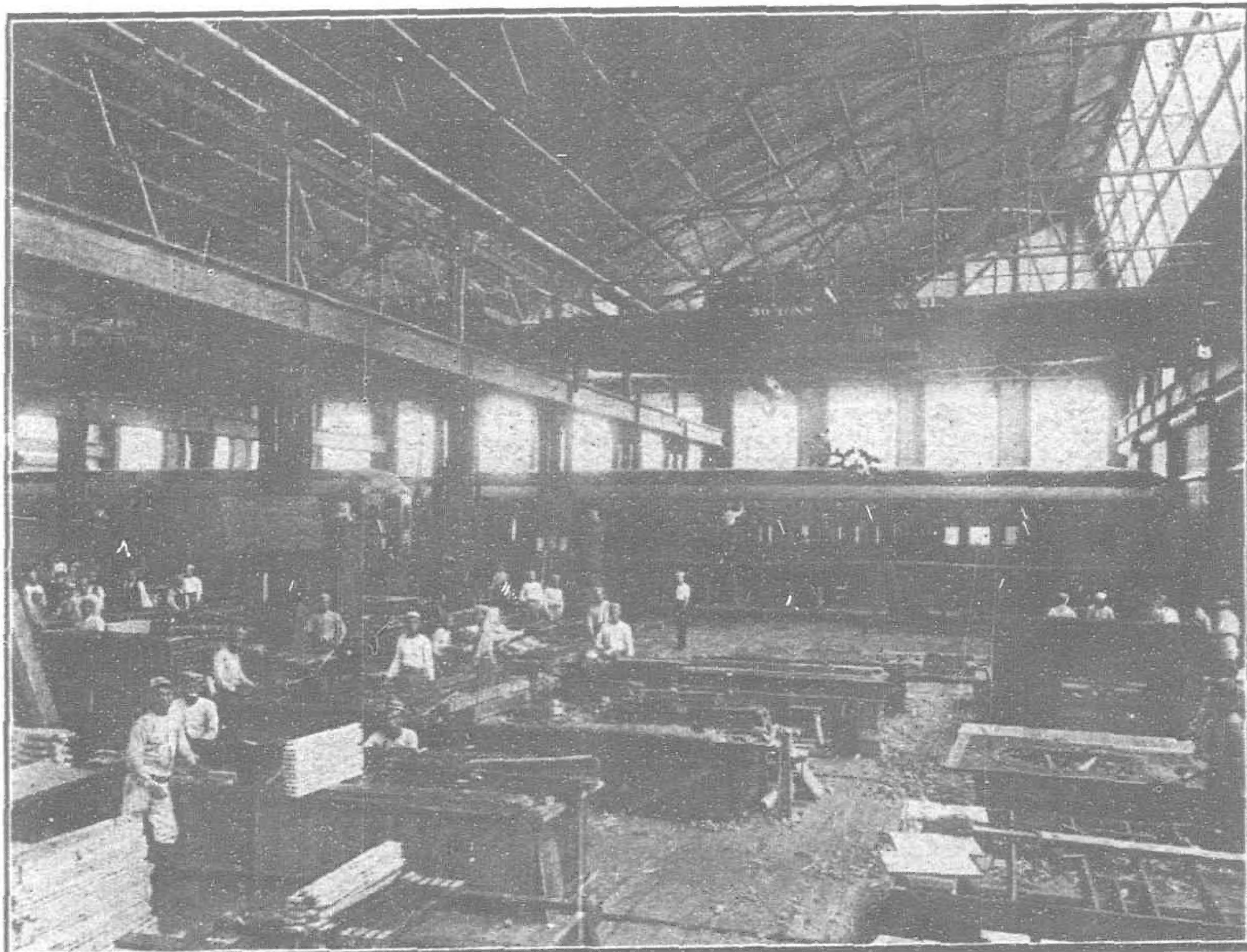
The 75 ft. Traverser operates between the Passenger Car Shop and the Paint Shop, and is also available for the Timber Drying Kiln, and the Train-Lighting Equipment Repairing House.

The Cleaning Pit House is situated to the west of the north end of the Locomotive and Machine Shop.

The General Stores is 180'-0" west of the Locomotive and Machine Shop, with its south end in line with the south end of the latter. The Oil



The Engine Shop.



The Passenger Car Shop.

and Rubber Store is built close to the south end of the General Stores.

To the west of the General Stores, and 100'-0" from it, is the Air-Brake, Wheel and Truck Shop with its south end in line with the south ends of the General Stores and Locomotive and Machine Shop. In the same line, 70'-0" to the west of the Air-Brake, Wheel and Truck Shop, is situated the Wood Mill and Freight Car Shop.

The 70'-0" Turntable is placed outside the north-east corner of the Locomotive and Machine Shop in a line with the northernmost of the Twenty-two Repairing Pits. The Locomotive Weighing and Preparation Shed is 417'-0" to the north of the Turntable.

The Pumping Station is located in an isolated position to the south-east of the Paint Shop.

The plan on page 87 shows the grouping of the workshops.

Construction of Buildings.—The Locomotive and Machine Shop, the Boiler Shop and the Smith Shop are each built of a steel skeleton structure with steel roof trusses, enclosed in independent brick walls.

The General Stores, Foundry, Pattern Shop and Pattern and Foundry Stores, Power House, Paint Shop, Cabinet, Upholstering and Passenger Car Shop, Wood Mill and Freight Car Shop, Air-Brake, Wheel and Truck Shop, Cleaning Pit House, Locomotive Weighing and Preparation Shed, Testing Laboratories and Fire Brigade and Night Watch's Station are built of steel skeleton structures with steel roof trusses. Their sides and ends are covered with a double thickness of corrugated galvanized sheet iron, 18 W.G. thick, laid with one corrugation side lap and 6 inches and lap, with rivetted fastenings. The air space which is left between the thicknesses, contains a layer of Bituminous Hair Felting, in order to maintain the buildings, as far as possible, cold-proof.

The building materials for the General Stores, Foundry, Pattern Shop and Pattern and Foundry Stores, Paint Shop, Cabinet, Upholstering and Passenger Car Shop, Wood Mill and Freight Car Shop, Air-Brake, Wheel and Truck Shop and the Boiler Shop were entirely supplied by Craven Bros. Ltd., Manchester, England. The materials for the Power House, Cleaning Pit House, Locomotive Weighing and Preparation Shed, Testing Laboratories, Fire Brigade and Night Watch's Station were supplied by the Patent Shaft and Axletree Co., Ltd., Wednesbury, England.

The roofs of the two latter groups of buildings are covered with 1½" grooved and tongued Oregon Pine boards, upon which is placed one thickness of Crave's Patent Roofing Sheet, well nailed down and finished with a coating of mastic compound, spread over with fine sand.

The skylights are of Mellowes' Patent "Eclipse" type lead covered steel bars, manufactured by Mellowes & Co., Ltd., Sheffield. They are glazed with rough cast glass, ¼ inch thick, and provided, wherever necessary, with double flat ventilators fitted with Leggott's "Silens" opening gear.

The window sashes are the latest type "Fenestra" steel section, of the Critall Manufacturing Company. Each sash is provided with a ventilation area. All sashes over the doorway are fixed.

The lantern sashes in the Foundry, Boiler Shop and Power House are provided with opening gear, worked from the ground. All the sashes are glazed with ¼ inch rough cast glass.

Each of the aforementioned buildings, with the exception of the Cleaning Pit House, is provided with its own sanitary arrangements, which are accessible only from the interior of the building. The urinals and latrines were manufactured by Morrison, Ingram & Co., Manchester.

All the above buildings, with the exception of the General Stores, are fitted with Kinnear's Patent Roller Shutter Metal Doors, manufactured by A. L. Gibson & Co., London. In some cases additional sliding fire-proof doors are provided in the sides of the building. The General Store is fitted throughout with sliding fire-proof floors, provided with small wicket doors.

The skeleton steel structures for the Locomotive and Machine Shop and the Smith Shop were supplied by The Morgan Engineering Co., Ohio, U.S.A.

The roofs of these buildings are covered with grooved and tongued Oregon Pine boards 1½" thick, and laid with four thicknesses of tarred felt, cemented with molten pitch and well nailed down to the roof boards. Finally a coating of molten pitch was uniformly spread over the felt and covered with gravel sand.

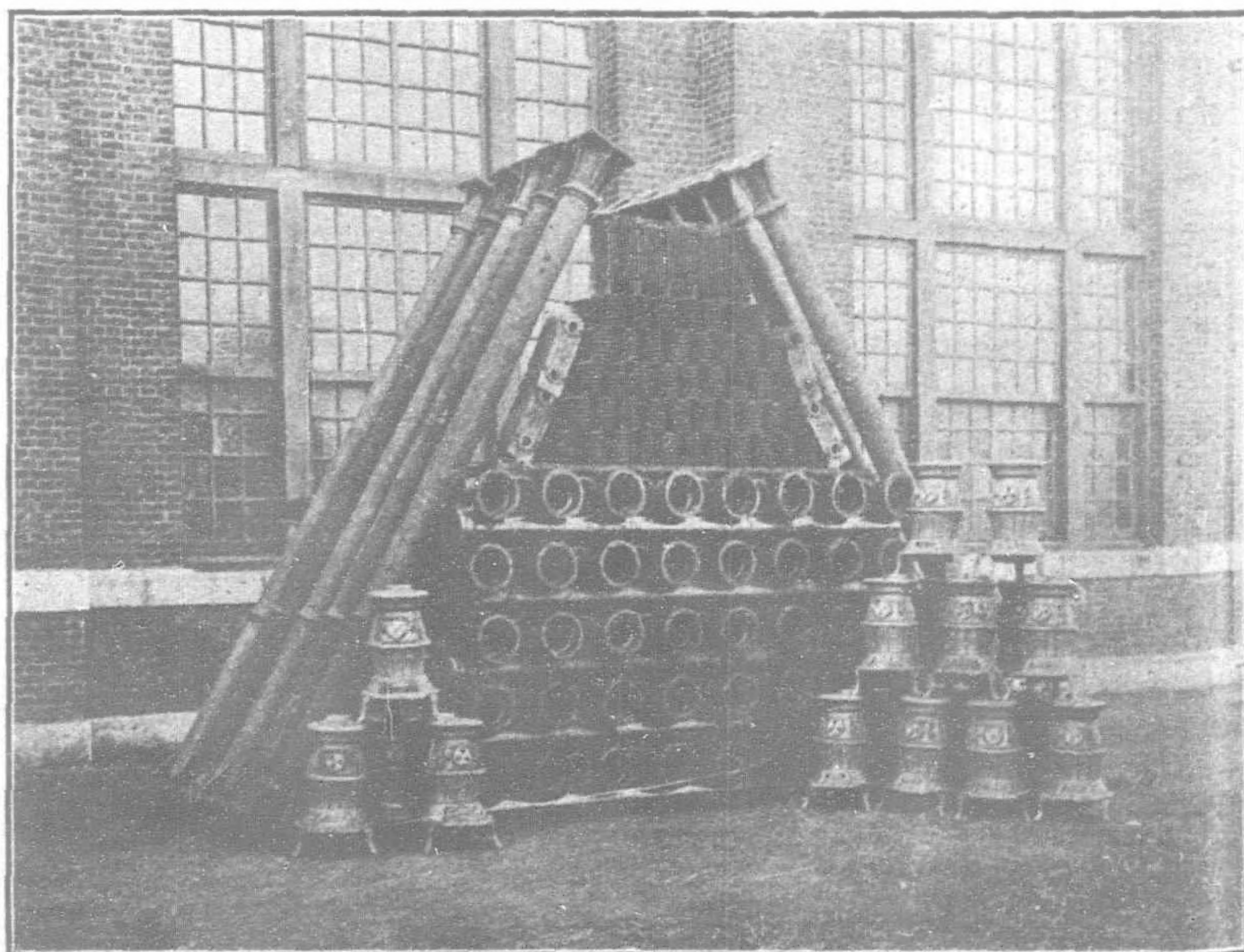
The skylights for these two buildings are made of galvanized metal bars, glazed with wire glass ¼ inch thick.

The window sashes are made of wood fitted in wooden frames in the brick walls. All the side and end windows are made with their lower one-third area to open upwards, with the provision of balancing weights.

The lantern sashes are made in a similar way to the window sashes, and are provided with opening gear worked from the floor. This opening gear was manufactured in the workshops themselves. The sashes are glazed with ¼ inch wired glass.

The doors are the aforementioned Kinnear's Patent Roller Shutter Metal Doors; some of them being provided with wicket floors. In the case of the Locomotive and Machine Shop there are also two wooden doors in the East wall, and one similar door in the West wall.

The Timber Drying Kiln, Train-Lighting Equipment Repairing House, and the Oil and Rubber Stores are built of brick walls with wood roof trusses. The roofs are covered



Examples of foundry work.

with $\frac{1}{2}$ inch thick boards and one thickness of "Malsoid" roofing sheet. The windows have wooden sashes, glazed with common glass.

The Timber Drying Kiln has wooden doors and the other two buildings patent folding metal shutter doors.

Finally there are three smaller buildings; one built of wood and covered with corrugated sheeting, is used as the Timber Store, and two with wooden structures and corrugated sheeting walls and roof, one used as an auxiliary store and the other as the Workmen's Messroom.

Lighting.

The Lighting of all the workshops and the yard is accomplished by the lamps enumerated in the table below. The lamps are lighted by 25 cycle 100 volt alternating current transformed from the 2,100 volt main, coming from the Dairen Central Electric Station.

For the smaller units the Tungsten Filament Incandescent Lamp is used, and for the larger units, the Flame Arc Lamp. All the lamps were supplied by Allgemeine Electricitats Gesellschaft, Berlin.

| | Tungsten Lamps | | Flame Arc Lamps | Total |
|------------------------------|----------------|----------|-----------------|-------|
| | 25 c.p. | 100 c.p. | 1,200 c.p. | K.W. |
| Loco. Shop... | .. | 32 | 11 | 8.7 |
| Machine Shop. | .. | 86 | — | 8.6 |
| Cleaning Shed | .. | — | — | — |
| Loco. Weighing & Prep. Shed. | .. | 13 | — | 1.3 |
| Boiler Shop. | .. | 18 | 8 | 5.8 |
| Smith Shop. | .. | 6 | 18 | 9.6 |
| Foundry .. | .. | 40 | 12 | 10.0 |
| Pattern Shop. | .. | 27 | — | 2.7 |
| General Stores | .. | 16 | — | 1.6 |
| Truck Shop. | .. | 49 | — | 4.9 |
| Wood Mill. | .. | 25 | — | 2.5 |
| Freight Car Shop. | .. | 45 | — | 4.5 |
| Passenger Car Shop. | .. | 33 | — | 3.3 |
| Cabinet Shop. | .. | 18 | 3 | 3.3 |
| Upholstery Shop... | .. | 5 | 4 | 2.5 |
| Paint Shop. | .. | 48 | — | 4.8 |
| Battery House. | .. | 3 | 3 | 0.4 |
| Timber Drying Kiln. | .. | — | — | — |
| Power House. | .. | 49 | — | 4.9 |
| Pumping Station.. | .. | 9 | 3 | 0.5 |
| Testing Laboratory. | .. | 16 | — | 1.6 |
| Fire Bridge Station. | .. | 16 | — | 0.4 |
| Switcher's Office. | .. | 2 | 3 | 0.4 |
| General Office. | .. | 9 | 37 | 3.9 |
| Yard. | .. | 29 | 4 | 4.9 |
| Total: | 39 | 601 | 60 | 91.1 |

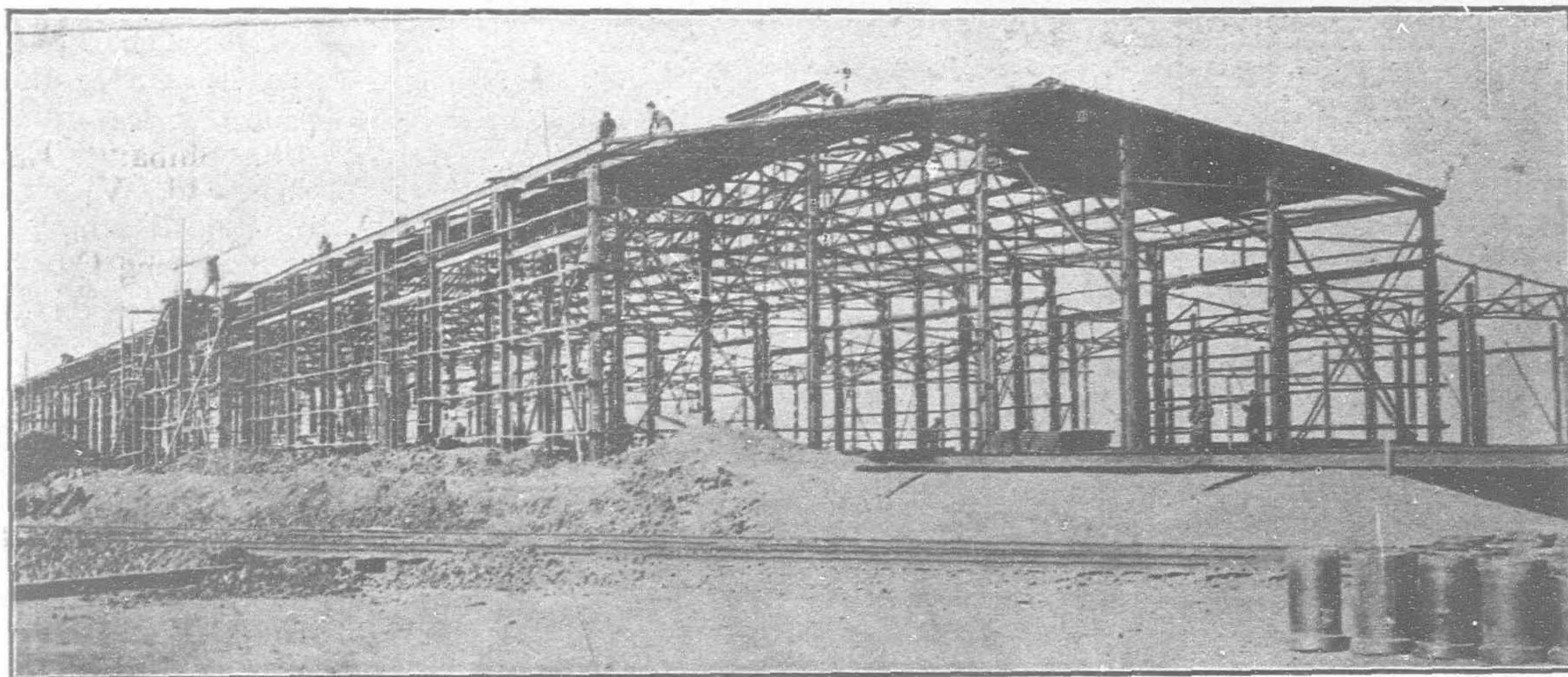
Water Supply and Drainage System.—After careful investigation and search for water sources, it was decided to put in an independent water works for the supply of water to the Workshops and Colony.

The Pumping Station is situated at a distance of about 230 yards South West of the Paint Shop. Three wells are sunk in the immediate vicinity of the pumping station, and another about one mile distant. The wells are from 20 to 30 feet in diameter and from 25 to 42 feet deep.

A brick-lined concrete reservoir of 100,000 gallons capacity, consisting of two enclosed cavities measuring 18 feet wide \times 40 feet long \times 26 feet at the highest point, with an oval top and flat bottom, is built on a hillside in the background. The bottom of the reservoir is 204 feet 6 inches above the ground level of the workshops.

The Pumping Station equipment consists of:—Two sets of Rees Roturbo Pumps, each directly coupled to a 60 B.H.P. 3-phase motor for 220 volts 25 cycle A.C., with a suitable special double automatic liquid starter; both are mounted on a combination

baseplate: one set of lightning arresters, two 50 K. V. A. unity - power-factor transformers, to transform 2,100 volts supply current to 220 volts, two high tension oil interrupters, two long tension interrupters, an electrically operated reservoir water level recorder, and all usual equipments mounted on



The Store House—now completed.

switchboards.

The speed of the motors is rated at 1,440 revolutions per minute, and each pump is capable of delivering a maximum quantity of 400 gallons of water per minute, against a maximum total head of 275 feet, including suction and the pipe friction.

There are, on higher levels, a settling reservoir measuring 40 feet diameter \times 14 feet deep (working depth), and filter bed measuring 60 feet \times 90 feet \times 8 feet deep (working depth). The bottom of the former is 28 feet 5 inches above the ground level of the workshops, and that of the latter is 16 feet 9 inches. Water pumped into the settling reservoir passes, by gravity, into the filter bed, and from there into a supplementary reservoir well, sunk close to the pumping station.

One of the Rees Roturbo Pumps described above, is used for pumping, through 6 inch piping, water from the supplementary reservoir well into the main reservoir, from whence it is supplied to the workshops and colony through an 8 inch main.

Waste waters from the different workshops are discharged, through glazed earthenware pipes, ranging from 4 inches to 18 inches in diameter, and are collected in a series of manholes connected by a main drain, 24 inches in diameter, discharging into an open gutter running along the eastern boundary of the work's enclosure.

Surface water, resulting from rainfalls, is also drained into the manholes above mentioned. Waste water from the houses in the Colony is similarly disposed of by underground drainage, and discharged into the same open gutter.

The building of a septic tank is under consideration, in order to improve the existing sanitary arrangements.

Suppliers of Equipment.—The following firms are the suppliers of the principal Machine Tools and various Equipments to Shakako Works.

(a) Locomotives and Machine Shop Machinery and Equipment.—Sir G. W. Armstrong, Whitworth & Co. Ltd., Alfred Herbert Ltd., Henry Broadbent Ltd., Joshua Buckton & Co., Ltd., J. Butler & Co., Francis Berry & Sons, Craven Bros., Ltd., Darling & Sellar Ltd., George Swift & Sons, Hulse & Co., Ltd., Kendall & Gent Ltd., Luke & Spencer Ltd., William Muir & Co., Ltd., Maud & Turner, Beyer, Peacock & Co., Ltd., J. Perkinson & Son, Smith & Coventry Ltd., Sharp, Stewart & Co., Ltd., H. W. Ward & Co., Ltd., S. Worssam & Co., The American Tool

Works Co., The Acme Machinery Co., B. F. Barnes Co., The R. K. Le Blond Machine Tool Co., Brown and Sharp Manufacturing Co., Cambersburg Engineering Co., Curtis & Curtis Co., Flather Co., The Walter H. Foster Co., Hilles & Jones Co., Heald Machine Co., Niles-Bement-Pond Co., Putnam Machine Co., Petter & Johnston Machine Co., William Sellers & Co., Smith & Mills, Steptoe Shaper Co., Wiley & Russell Manufacturing Co., Wells Bros. Co. and J. E. Reinecker.

(b) Hydraulic Machinery.—Fielding & Platt Ltd.

(c) Wood-Working Machinery.—A. Ransome & Co. Ltd. and Thos. Robinson & Son Ltd.

(d) Boiler Shop Machinery.—Alldays & Onions Pneumatic Engineering Co. Ltd., B. F. Barnes Co., Francis Berry & Sons Ltd., Joshua Buckton & Co., Ltd., Campbells & Hunter Ltd., The Chicago Pneumatic Tool Co., Cleveland Punch & Sheer Works Co., Walter H. Foster Co., Greenwood & Batley Ltd., Alfred Herbert Ltd., James Keith & Blackman Co., Ltd., Kendall & Gent Ltd., Muenneth u. Knoechel, Luke & Spencer Ltd., Wm. Muir & Co., Ltd., Henry Pels & Co., Roberts Bros. and Joseph T. Ryerson & Son.

(e) Foundry Machinery and Equipment.—The Consolidated Pneumatic Tool Co., Ltd., Craven Bros., Ltd., James Evans & Co., Green & Co., J. W. Jackman & Co., Ltd., G. Kite & Co., The London Emery Works Co., The Morgan Crucible Co., Ltd., The Pneumatic Engineering Appliances Co., Ltd., Wm. Sellers & Co., Thwaite Bros. Ltd. and Whiting Foundry Equipment Co.

(f) Smith Shop Machinery and Equipment.—Alldays & Onions Pneumatic Engineering Co., Ltd., The Ajax Manufacturing Co., Babcock & Wilcox Ltd., Brett's Patent Lifter Co., Ltd., Cochran & Co., Annan Ltd., Craven Bros., Ltd., Fielding & Platt Ltd., Henschel u. Sohn., James Keith & Blackman Co., Ltd., B. and S. Massey, Mitsubishi Dockyard & Engineering Co., Wm. Muir & Co., Ltd. and National Machinery Co.

(g) Wheel, Brake and Truck Shop.—The Acme Machinery Co., Alldays & Onions Pneumatic Engineering Co., Ltd., B. F.

Barnes Co., Joshua Heap & Co., Ltd., James Keith & Blackman Co., Ltd., Kendall & Gent Ltd., B. and S. Massey, Wm. Muir & Co., Ltd., Walter Newbolds & Co., Ltd., Niles-Bement-Pond Co., Smith & Coventry Ltd., Wells Bros. Co. and Westinghouse Air Brake Co.

(h) Dynamo Engines, Generators, Air Compressor, Motors and Electric Equipments.—Allgemeine, Electricitats Gesellschaft,

Bellis & Morcom Ltd., Dick, Kerr & Co., Ltd., Felten u. Guillaume, General Electric Co., General Electric Co., Ltd., Greenwood & Batley Ltd., Ingersoll-Rand Co., Lancashire Dynamo & Motor Co., Ltd., Laurence, Scott & Co., Ltd., Mather & Platt, Ltd., Mitsubishi Dockyard & Engineering Works, Shibaura Engineering Works, Veritys Ltd., Vickers, Sons & Maxim Ltd. and Westinghouse Electric and Manufacturing Co.

(j) Boiler Plant.—Babcock & Wilcox.

(k) Pumping Plant.—The Rees Roturbo Manufacturing Co., Ltd.

(l) Stanlock Heating System.—Standard Engineering Co., Ltd.

(m) Automatic Sprinkler Installation.—Mather & Platt, Ltd.

(n) Cranes, Lifts, Conveyors, Turntable and Traverser.—Babcock & Wilcox, Ltd., G. Booth & Sons, Ltd., A. Borsig, Brown Hoisting Machine Co., Cowan Sheldon Ltd., Craven Bros., Ltd., Herbert Morris & Bastert, Ltd., Patent Shaft & Axletree Co., Ltd., A. W. Penrose & Co., Ltd., Ransomes & Rapier, Ltd., Shaw Electric Crane Co. and Stothert and Pitt, Ltd.

(p) Building Material.—Craven Bros., Ltd., Markham & Co., Ltd., Crittall Manufacturing Co., Ltd., A. L.

Gibson & Co., Ltd., The Morgan Engineering Co. and Patent Shaft and Axletree Co., Ltd.

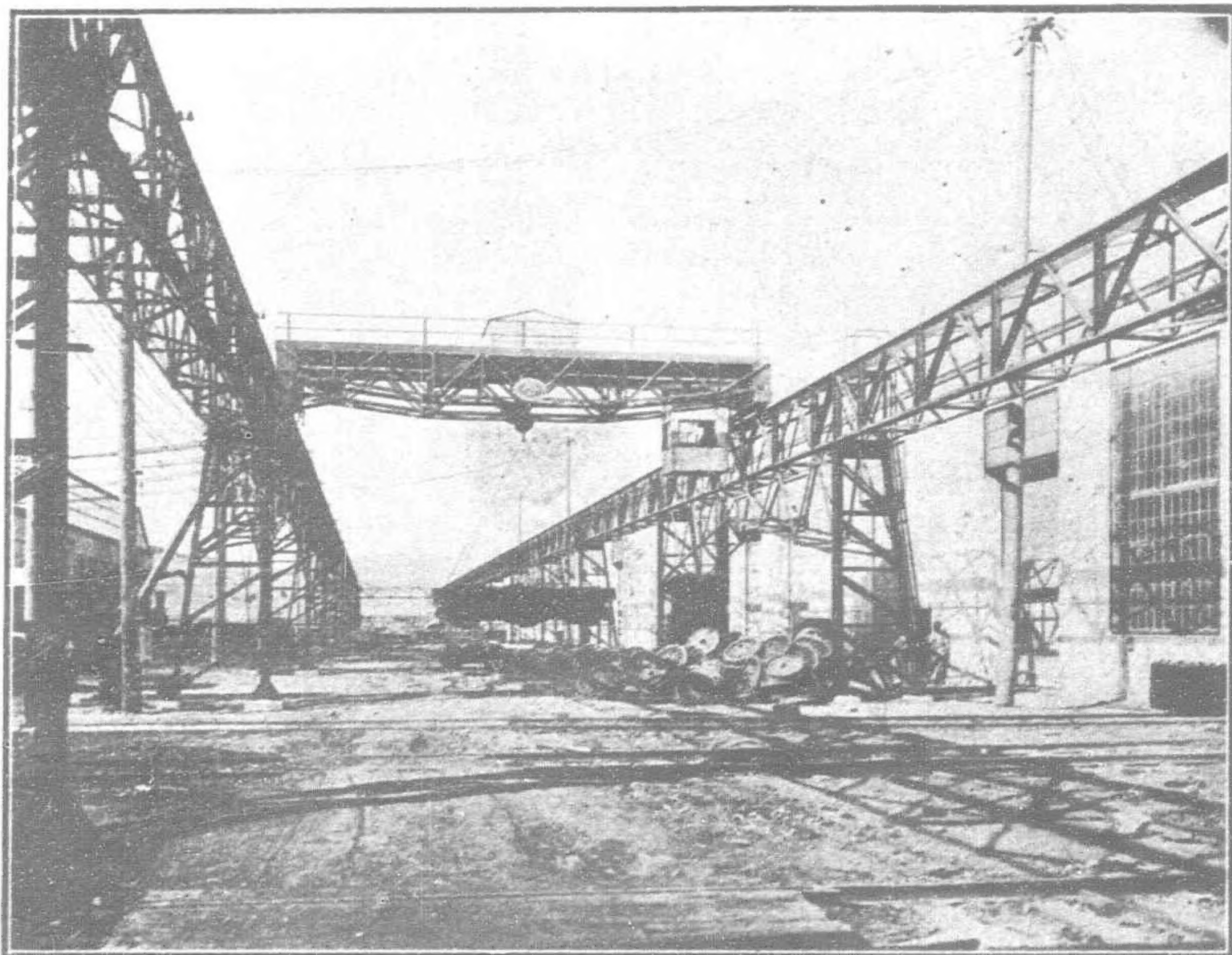
(q) Testing Machinery and Equipment.—W. H. Bailey & Co., Ltd., Joshua Buckton & Co., Ltd., Edward G. Herbert Ltd., Hallwachs u. Co. and Tinius Olsen & Co.

(r) Locomotive Weighing Plant.—W. & T. Avery Ltd.

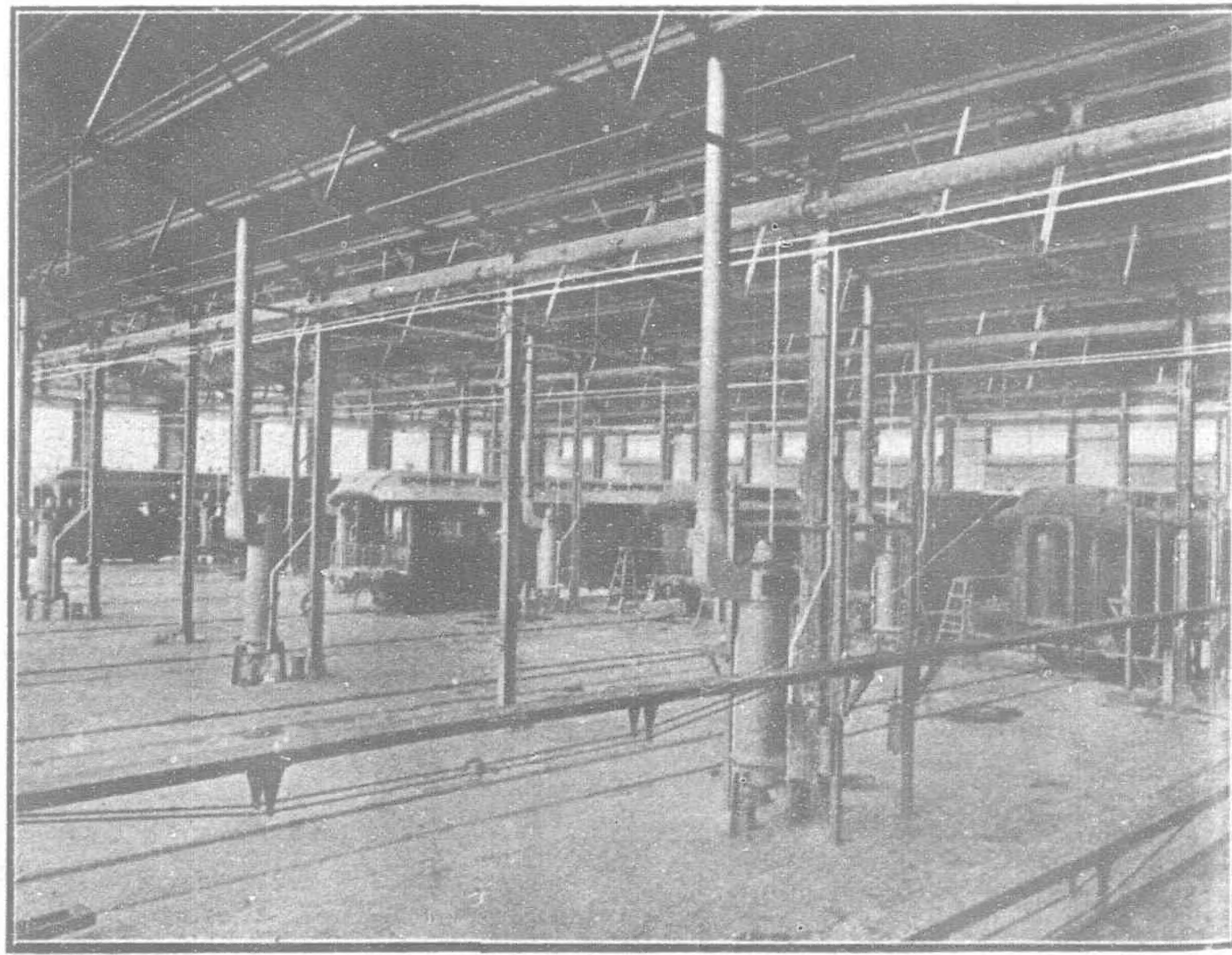
(s) Miscellaneous.—British Vacuum Cleaner Co. Ltd., W. Canning & Co. (Electro-Plating Plant.) Morison Ingram & Co., Ltd. (Sanitary Arrangements.) Shand Mason & Co. (Fire



Water Tank.



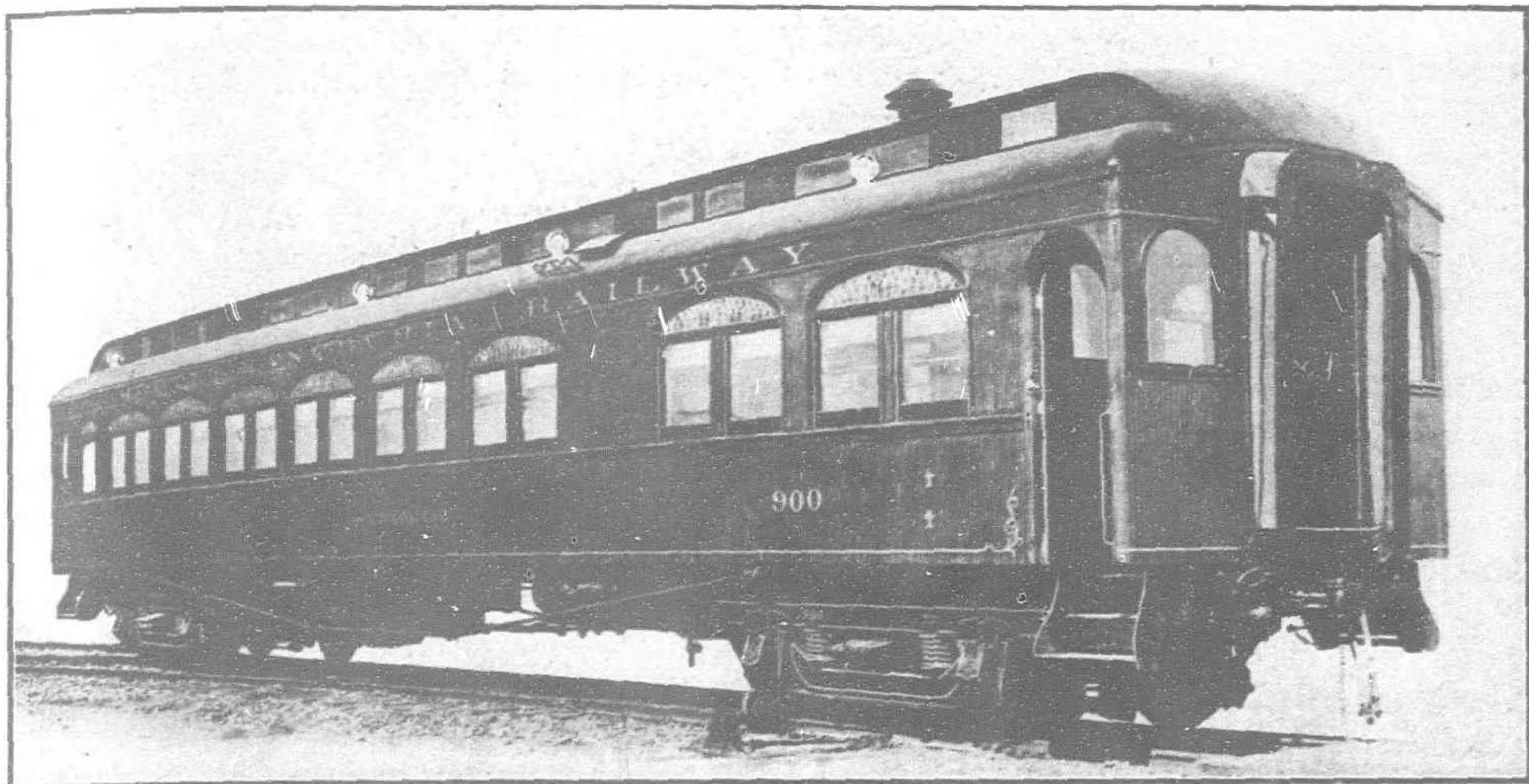
Overhead Traveller.



Paint Shop.

Engine.) Shanks & Co., Ltd. (Sanitary Arrangements.) The Synchronome Co. (Electric Clock System.) Torrance & Sons, Ltd. (Paint Mill.) The Valor Co., Ltd. (Oil Cabinet.) Rud., Otto Meyer. (Office Heating.)

Steam and Water Drum { Diameter 4 feet.
Length 24 feet 3 inches.
Diameter of Stop Valve 7 inches.
Working Pressure 150 lbs. per sq. inch.



Cranes and other Lifting and Conveying Appliances.—The conveyance of heavy articles, both indoors and outdoors, has received special attention and has been carried out in a most thorough and complete manner. The Overhead Crane System forms one of the most noticeable features of the workshops.

Full details of the Cranes, Conveyors and other Lifting Appliances may be gathered from the following table.

From the table showing the distribution of electric power in the different workshops, the following data have been deduced:—

| | Total rated H. P. of motors used for power. | Approximated rated H.P. of motors per 100 sq. yards of floor area. | Rated H.P. of motors per work- man employed. |
|---------------------|---|---|--|
| Locomotive Shop. | 408 | 118 | 3.264 |
| Machine Shop. | 632 | 107 | 2.603 |
| Boiler Shop. | 416 | 105 | 1.524 |
| Smith Shop. | 138 | 29 | 1.190 |
| Foundry. | 226 | 65 | 1.467 |
| Pattern Shop. | 36 | 51 | 1.800 |
| Truck Shop. | 255 | 60 | 2.040 |
| Wood Mill. | 310 | 145 | 5.167 |
| Freight Car Shop. | 114 | 20 | 0.648 |
| Passenger Car Shop. | 253 | 50 | 1.571 |
| Paint Shop. | 9. | 2 | 0.128 |

The men employed, including both Japanese and Chinese workmen, who were present on December 21, 1911, totalled 1,665. The total rated horse power of motors installed throughout the workshops, is 2,907.5. By dividing the latter by the former, the average rated H.P. per workman employed, is 1.746.

The Power Plant.—The Boiler Plant was completely supplied by Babcock & Wilcox, Ltd., London. It consists of three batteries of water tube boilers, the particulars of which are as follows:—

| | | |
|---------------------------------|---------------|-------|
| Heating Surface | 4,400 sq. ft. | each. |
| Grate Area (8'-0" × 12'-0") | 96 sq. ft. | each. |
| Number of Sections | 18 | each. |
| Number of tubes in each section | 11 | |
| Diameter of tubes | 4 inches. | |
| Length of tubes | 18 feet. | |

Each boiler is fitted with Babcock & Wilcox's patent Integral Superheater, each having 552 square feet of heating surface, consisting of 64 "U" tubes 1½ inch diameter, and suitable for imparting 100 degree Fahrenheit of superheat to the steam generated in the boiler.

Babcock & Wilcox's patent Chain Grate Stoker is fitted to each boiler, each having a grate area of 96 square feet. A line of 3 inch shafting, driven, by an 8. H.P. motor, through an entirely enclosed worm reducing gear in an oil bath, transmits the motion to each individual grate, by means of a chain drive.

The speed of the motion of the grate can be varied from 6½ feet to 25 feet per hour while the driving shaft is running at 50 revolutions per minute.

Five groups of Green's Patent Fuel Economiser, consisting of a total of 720 tubes, each tube 9 feet long and 4⅞ inches in diameter, are fitted in the main smoke flue leading to the

chimney, in a position between the boiler batteries and the partition wall. Two motors 2 H.P. and 1½ H.P. respectively, drive the selfacting triple scrapers.

There are three "Weir" vertical direct acting boiler feed pumps, one having 9" water ram, 12" steam cylinder and 21" stroke, and the two others 8" water ram, 10" steam cylinder and 18" stroke.

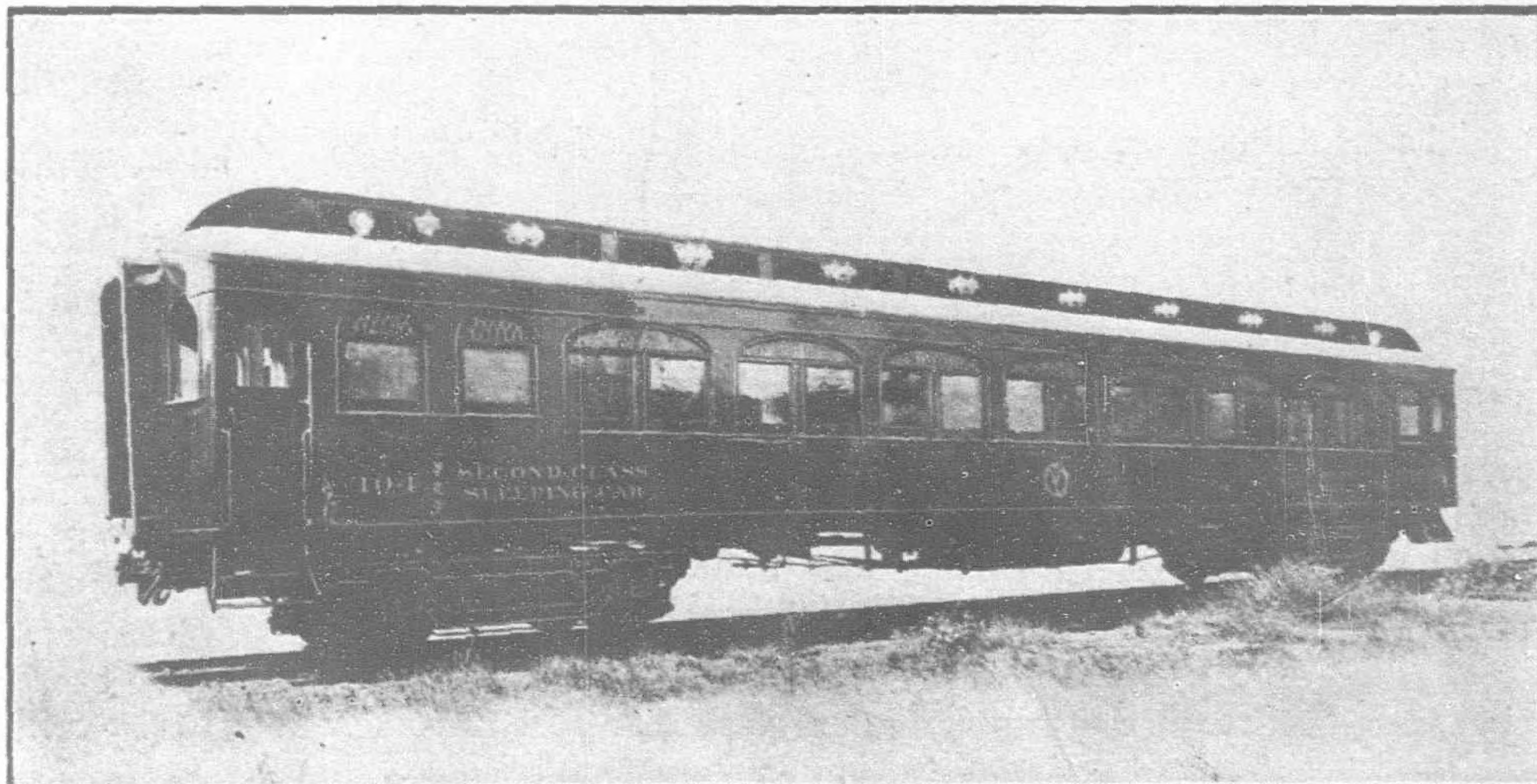
The chimney for the boiler plant is of the self-supported type, built of steel plates and standing upon a brickwork base. The diameter at the top is 9 feet, and at the bottom 16 feet, the chimney being coned for a distance of 20 feet from the base. The length of the steel part of the chimney is 150 feet, and the total height above ground is 157 feet.

The delivered coal drops into a receiving hopper, and then passes through a simplex valve into the automatic filler, and fills the buckets of the endless chain-bucket coal conveyor. It is then dumped from there into any of the six overhead coal bunkers in the boiler plant, from whence it is fed to the coal receiver for each grate, by the working of a pull chain.

The ashes are raked to the front of the boilers, shoveled, through the openings in the foot plate, into the buckets (as they pass the ash trench), by which they are raised and dumped into the ash bunker outside the boiler plant.

The coal conveyor is capable of handling about 20 tons of coal per hour, with a chain speed of 45 feet per minute; each bucket having a capacity of about one cubic foot. The conveyor is operated by one 3½ H.P. motor.

The coal receiving hopper, which has a capacity of about 10 tons, is covered with a grid having 3 inch square spaces.



The aggregate storage capacity of the overhead coal bunkers, heaped, amounts to about 380 tons, and that of the ash bunker, heaped, about 40 tons.

The main steam pipe—10" diameter—is arranged in the Engine Room running along the partition wall, and is connected with each boiler by 7" diameter piping.

In the Engine Room there are installed,—two sets of Steam Engines directly coupled to 400 kilowatt dynamos, two sets of 250 kilowatt Motor Generators, one Air Compressing Engine and one Fire Service Pump (described under the heading "Fire Protection").

The steam dynamos were supplied by Bellis & Morcom Ltd., Birmingham, and by Dick, Kerr & Co., Ltd., Preston.

The Engines are Compound Two-Crank Two-Cylinder Vertical Enclosed Double-Acting Self-Lubricating High Speed Non-Condensing type, with high and low pressure cylinder diameters, 19 inches and 27 inches respectively, and 12 inches of stroke. They are capable of giving an output of 570 B.H.P., working at 575 revolutions per minute and 150 lbs. per sq. inch pressure.

The steam consumption per B.H.P. per hour under the above mentioned conditions, subject to the steam being superheated to 466° Fahrenheit at the engine throttle valve and non-condensing exhaust, is estimated at 18.1 lbs.

The Dynamos are Compound Wound Direct Current type, capable of giving an output of 400 kilowatts at 250 volts, 375 revolutions per minute.

The Motor Generator sets were manufactured by Shibaura Engineering Works, Tokyo, Japan. Each unit consists of one 370 B.H.P. 2,000 volts, Three-Phase, 25 Cycle Induction Motor coupled to two 125 kilowatt 250 volts Compound Wound Direct Current Dynamos, at each end of the same shaft.

Three sets receive the current from the Central Electric Station at Dairen, and, when the dynamos are worked in series, supply power to that portion of the Tramway System which lies South West of the Chinese town of Shokoshi; i.e., the tramways from Shokoshi to Shakako and to the seaside resort of Star Beach (Hoshigaura), and, when worked in parallel, supplement the workshop power.

When only a smaller power is wanted in the workshops, e.g., in the case of overtime work being carried on of an evening in a part of the shops, one of these 250 kilowatt motor-generators is operated, to economise the supply of power.

The switch boards, which are fitted along the West wall of the engine room, consist of:—

- 2 panels for the steam dynamo sets.
- 13 panels for the shop feeders.
- 6 panels for the motor-generators.
- 2 panels for the traction feeder.

The panels are adequately and completely equipped with all necessary equipments in accordance with the most modern practice.

The Air Compressing Engine was built by the Ingersoll-Sergeant Drill Co., New York. It is the Duplex Compound Steam and Compound Air Non-condensing type, with intercooler

It has:—High Pressure Steam Cylinder diameter 16 inches.
Low Pressure Steam Cylinder diameter 24 inches.
High Pressure Air Cylinder diameter 14 $\frac{1}{4}$ inches.

Low Pressure Air Cylinder
Stroke

diameter 22 $\frac{1}{4}$ inches.
18 inches.

It is capable of compressing air to 100 lbs. per square inch pressure at 80 to 100 lbs. pressure of steam; and, when operating at 120 revolutions per minute, it will have a piston displacement capacity of 925 cubic feet of free air per minute and with terminal air pressure of 100 lbs. per square inch, it will develop about 157 I.H.P. in its steam cylinders.

The Steam Generation is sufficient to cover the supplies to the above mentioned steam engines, the 325 "Stanlock" heater units (described under the heading "Heating System"), and to the steam hammers in the Smith Shop. For the two last named purposes, an underground closed main duct extends from east to west between the two groups of workshop buildings, viz.—The Freight Car Shop, Truck Shop, General Stores and Machine and Locomotive Shop on the north side, and the Passenger Car Shop, Power House, Foundry and Smith Shop on the south side. The separate buildings are reached by branch ducts from this main.

The greatest diameter of the steam main outgoing from the Power House is 9 inches, and that of the incoming return main, for the water of condensation, is 4 inches. Expansion bends are well provided throughout the pipings, and a gate valve is provided for each building, in order that the supply may be cut off from any building whenever desired.

These underground ducts also serve for the distribution of the Automatic Sprinkler Supply and Compressed Air Supply pipings; the latter having a main of 6 inch Mannesman tubes, and thereby being branched off to the several buildings.

The Power Supply throughout the whole workshops, as may be seen from the foregoing descriptions, is by 250 volts direct current, and all the electric motors are wound for 220 volts direct current, without exception.

Traverser.—The Traverser, which operates between the

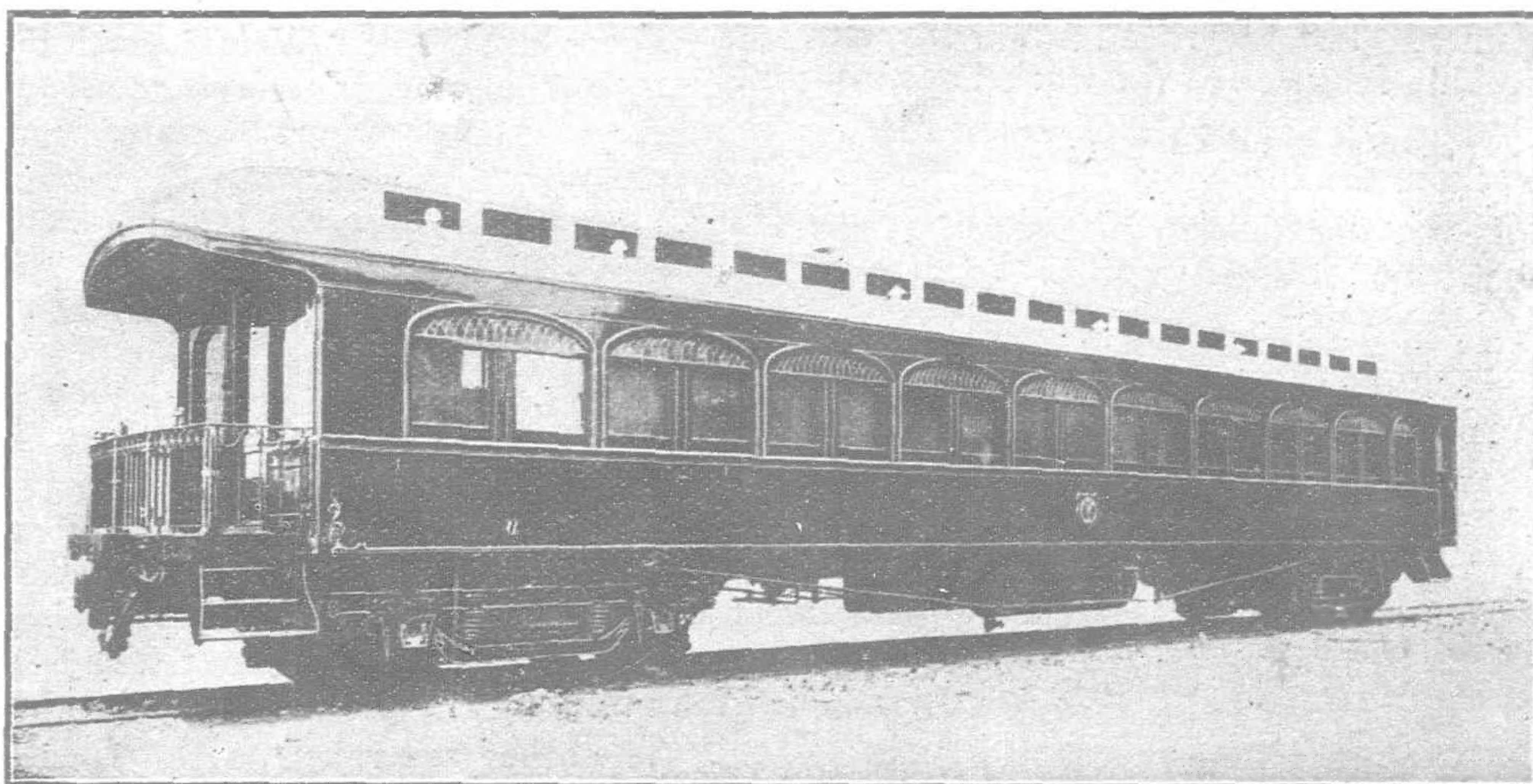
Passenger Car Shop and the Paint Shop, was built by Ransomes & Rapier Ltd., Ipswich, England. It is very strongly built, and capable of moving a sleeping car weighing 60 tons, at traversing speed of 150 feet per minute.

The following particulars may be worthy of mention:—

| | |
|--|-----------------------|
| Length of Traverser Pit | 521 feet 9 inches. |
| Width of Traverser Pit | 75 " 2 " |
| Length of Traverser Table | 75 " 0 " |
| Width over the ends of cross girders | 18 " 5 " |
| Width of Platform | 15 " 0 " |
| Wheel Base, Crosswise | 12 " 6 " |
| Wheel Base, Lengthwise pitch | 9 " 1 $\frac{1}{2}$ " |
| Total Distance of Travel | 502 " 0 " |
| Depth from Rail on Traverser to Pit Rail | 9 " " |
| Number of Pit Runway Rails | 9 |
| Number of Carrying Wheels | 18 |

The Traverser is driven by a 40 B.H.P. motor running at about 400 revolutions per minute. The motor and the mechanism are completely encased in a corrugated sheet iron house.

The current is collected from overhead wires by means of a steel tube collector pole and rigid arm collector fitted to one end of the traverser, the wires being about 18 feet above rail level. The overhead wiring is carried by seven poles and arms.



Special Saloon Car.

The North and South edges of the Traverser Pit are about 72 ft. 6 ins. distant from the walls of the Passenger Car Shop and Paint Shop respectively.

The Traverser is used for transferring cars between the two abovementioned shops and as a means of communication between the Wood Mill and the Timber Drying Kiln and also for carrying timber to and from the timber Drying Shed.



First Class Dining Car.

Locomotive Turntable.—The Locomotive Turntable—at the entrance to the Locomotive Shop—calls for a brief description.

The turntable is of the Shallow Pit type, built up of two inverted fish bellied main girders, and 12 sets of cross girders, braced longitudinally at two intermediate centre lines, coinciding to the centres of the track rails. It is hung to a cast steel centre, which is supported by an intermediate piece provided with 16 conical rollers; the latter is in turn supported by a pivot made of case-hardened steel, set in a heavy cast iron base. The end cross girders each carry two sets of balancing rollers.

The diameter of the table is 70 feet, and the depth of the circular roller track in the pit, is 2 feet 8½ inches below the table track rails.

The turntable was built by The Patent Shaft & Axletree Co., Wednesbury, England.

Fire Protection.—With a view to protecting the valuable property from fire, the Dry Pipe System of the "Grinnell Patent Automatic Water Sprinkler," manufactured by Mather & Platt, Ltd., Manchester, has been provided in those buildings where combustible materials or articles are handled or stored.

The plant consists of five installations, as follows:—

| | | |
|--------------------------------|-----|------------------|
| General Stores, | 366 | Sprinkler Heads. |
| Pattern Shop and Stores | 202 | " " |
| Paint Shop, | 471 | " " |
| Passenger Car Shop, | 517 | " " |
| Freight Car Shop and Wood Mill | 710 | " " |

Total of Sprinkler Heads 2,266

Each installation is controlled by an alternate Hot and Dry Valve, by means of which the pipes can be filled with water in the summer months, or with compound air in the winter, when water would be liable to freeze.

In the event of an outbreak of fire, the sprinkler head nearest to the seat of the fire, is at once brought into motion by the heat of the fire itself.

The sprinkler heads are all made to fuse at a temperature of 155° Fahrenheit (68° C.). Immediately on the fusing of the sprinkler head, the water in the pipes is released; or in winter, when filled with compressed air, the air pressure is first released, and in its turn admits the water supply to the pipes. The water,

passing out of the fused sprinkler head, falls on to the "Spreader" of the sprinkler and is "sprinkled" over a wide area, covering the seat of the outbreak of fire.

Each installation is provided with an automatic alarm gong (fitted on the outside of the building) which operates instantaneously with the fusing of a sprinkler head within the building. In addition, the whole system is connected with an electric alarm attachment and an indicator board, which are installed in the Fire Brigade Station.

The Electric Alarm Attachment operates automatically upon the opening of any sprinkler head throughout the system, and at the same time, the Indicator Board at once shows the firemen the exact location of the outbreak.

Three motor-driven air pumps are provided, for charging the installations with compressed air. These are installed one each in the Pattern Shop Ground Floor, the Wood Mill and the Passenger Car Shop.

There are two sources of water supply, one from the Work's independent water main, the other from a well sunk outside the Power House. One No. 4 side, "Underwriter" Quadruple-Acting Horizontal Steam Pump,—18" steam cylinders, 10" water rams and 12" stroke—installed in the Power Plant, is capable of pumping water at the rate of 1,000 gallons per minute, into a cast iron tank—12'6" x 12'6" x 8'-0"—having a capacity of 7,500 gallons. This tank is placed at the top of a steel structure erected close to the west wall of the Power Plant; the bottom of the tank being 81 feet above the ground.

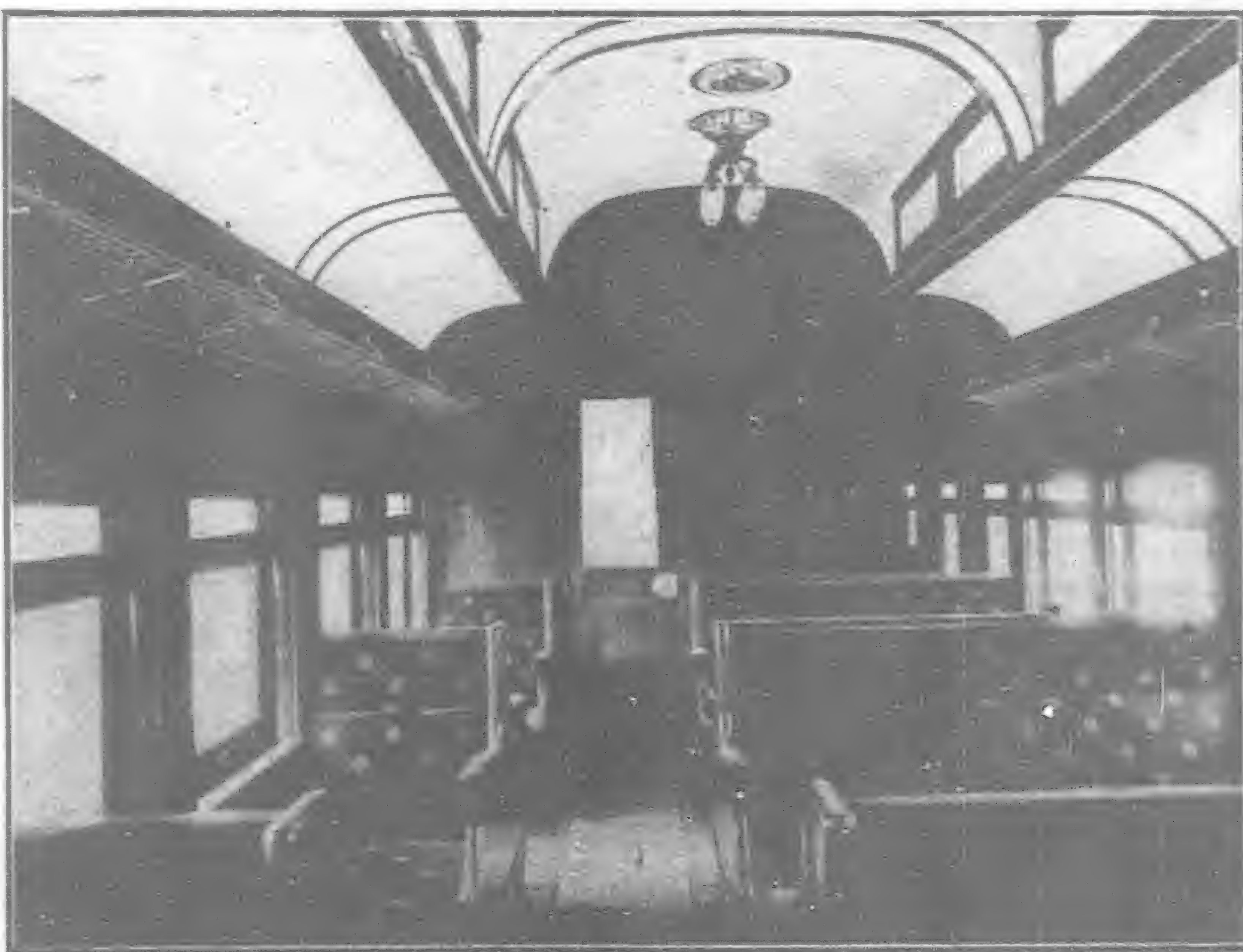
A 6" cast iron main, with branches of 4" pipes, supplies water from the tank to the different installations.

The gross cost of the installation amounts, on an average, to Gold Yen 1.68 per square yard of floor area of the five protected buildings.

One Sprinkler Head covers, on an average, 95.3 square feet of floor area.

In addition, and as an auxiliary to the Sprinkler System, a number of "Minimax" Chemical Hand Fire Extinguishers have been installed in the various shops and in the offices. By means of these, the workmen are able to cope with a fire occurring during working hours, in its incipient stages before the heat is sufficient to bring the sprinklers into action; thus saving water damage.

Each extinguisher is of 2 gallons capacity, and capable of



First Class Passenger Compartment.

projecting about 14 gallons of effervescing fluid to a distance of 35 feet in any direction.

The Fire Brigade Station is equipped with a Light Steam Fire Engine, manufactured by Shand, Mason & Co., London, a two-wheeled Hand Hose Cart and six 100 feet lengths of hose.

The engine is capable of pumping 150 gallons of water per minute, throwing a $\frac{1}{8}$ " jet to a height of 130 feet.

Heating System.—Each workshop, with the exception only of the Smith Shop, Cleaning Pit House, Locomotive Weighing and Preparation Shed and Power House is adequately equipped with a heating installation.

The system of heating used throughout, is the "Stanlock" Heating System, of the Standard Engineering Company, London, and is so calculated in each shop, as to maintain an internal temperature of 60° Fahrenheit, even when the external temperature is 10° below Zero Fahrenheit.

Each "Stanlock" unit consists of a nest of solid drawn steel tubes, screwed into a circular cast iron chamber. The former is encased in a cylindrical sheet metal wall, and the latter is connected with a steam supply pipe, an outlet for the water of condensation and a drain cock.

The water of condensation is collected in a steam trap and returned to the Boiler Plant by the action of the live steam pressure.

On the top of each such "Stanlock" unit, an electrically driven fan is fitted, driving the cold air into the nest of steam pipes, and expelling the heated air from the bottom opening of the heater.



Drawing room of special saloon.

The live steam is supplied at a pressure of about 100 lbs. per square inch.

The steam used for the heating system is supplied, by a system of underground steam mains, from the Central Boiler Plant, the water of condensation being returned thereto.

Each No. 1 unit will condense about 100 lbs. of steam per hour, and each No. 2 unit, about 150 lbs. per hour. The No. 1 unit will circulate about 2,000 cubic feet of air per hour, and the No. 2 unit, about 3,000 cubic feet per hour.

In the Paint Shop, each unit is connected with a fresh air intake pipe, extending through the roof; by means of which a supply of fresh air, to the extent of one change per hour, can be taken in even in the coldest weather. In this case each unit would condense about double the normal quantity of steam shown above.

The various workshops are equipped with the following heating units:—

| Buildings. | Size. | Number of units. | Floor Area covered by one Unit, (in square feet) |
|-------------------------------|---------------|------------------|--|
| Locomotive and Machine Shop | 1 | 88 | 958.6 |
| Boiler Shop. | 2 | 24 | 1,479.1 |
| Foundry. | 2 | 25 | 1,248.0 |
| Pattern Shop | Ground Floor. | 1 | 3 |
| | First Floor. | 1 | 3 |
| | Second Floor. | 1 | 6 |
| Paint Shop. | 2 | 35 | 1,291.4 |
| Passenger Car Shop. | 2 | 34 | 1,329.4 |
| Freight Car Shop & Wood Mill. | 1 | 53 | 1,328.3 |
| Truck Shop. | 1 | 32 | 1,200.0 |
| General Stores. | Ground Floor. | 1 | 8 |
| | First Floor. | 1 | 14 |
| Total | | 325 | 1,475.3 |

The total steam consumption for heating the shops, as shown in the foregoing table, is estimated at about 43,800 lbs. per hour. The total power for driving the motor fans is reckoned at 38 kilowatts.

The average cost of the installation, per one square yard of the net floor area of the buildings, amounts to, approximately,



Second Class Sleeping Car.

Gold Yen 4,290. This includes the cost of building outdoor ducts and branches, outdoor steam and return mains and valves, indoor pipings, and connections, and the cost of erection."

The Main Office Building is heated independently of the above mentioned system by means of low pressure steam.

Two Strehl's Sectional Boilers are installed in the basement of the building, each having the following capacity:—

| | |
|-------------------------|------------------|
| Boiler Heating Surface, | 115 square feet. |
| Water Contents, | 96 U.S. gallons. |

The boilers are worked at the low pressure of only 1.5 lbs. per square inch.

The steam and return mains are laid in a covered pit, provided in the ground floor.

A novel feature of this heating system is the draining of the steam risers. This is effected by means of special "U" shaped water loops, connecting the bottom of each riser with the return pipe.



50 ton Bottom Dumping Coal Car.

The water of condensation returns to the boilers by gravity.

The total number of radiators is 46, having a total radiating surface of 2,645.5 square feet.

This plant was supplied by Rud. Otto Meyer, Hamburg, Germany.

MACHINES INSTALLED IN THE SHOPS

Locomotive Shop.—2—M.D. Emery Tool Grinders, 1—M.D. Hydraulic Bushing Press, and Cylinder Boring and Valve Seat Facing Tools, worked by Pneumatic power.

Locomotive Weighing and Preparation Shed.—1—Locomotive Weighing Machine with Automatic Aerostatic Dials.

Boiler Shop.—1—M.D. Plate Edge Planing Machine, 1—M.D. Pel's Punching and Shearing Machine, 3—B.D. Punching and Shearing Machines, 1—M.D. Vertical Plate Bending Roll, 2—B.D. Horizontal Plate Bending Rolls, 1—M.D. High Speed Disc Metal Cutting Machine, 1—M.D. Double Head Tube Plate Drilling Machine, 1—M.D. Horizontal Boiler Shell Drilling Machine, 1—M.D. Full Universal Portable Radial Drilling Machine, 10—B.D. Drilling Machines (Assorted), 1—M.D. Boiler Tube Cleaning Machine, 1—B.D. Tube Welding Machine with Pneumatic Press, 1—B.D. Tube Sawing Machine, 1—B.D. Tube Cutting Machine, 1—B.D. Break Lathe, 1—B.D. Capstan Lathe, 1—M.D. Emery Tool Grinder, 12—Forge Fires, each with a M.D. Fan, 1—M.D. Smoke Exhaust Fan, 1—Plate Heating Furnace with M.D. Fan, 1—M.D. Hydraulic Power Pump, 1—Hydraulic Accumulator, 1—Hydraulic Flanging Press, 1—Hydraulic Stationary Rivetter, 3—Hydraulic Portable Riveters, and assorted Pneumatic Tools.

Machine Shops.—3—M.D. Wheel Lathes, 1—B.D. Wheel Lathe, 1—M.D. Axle Lathe, 1—M.D. Hollow Mandrel Lathe, 7—M.D. Lathes, (assorted), 45—B.D. Lathes, (assorted), 25—B.D. Drilling Machines, (assorted), 1—M.D. Sensitive Drill, 1—M.D. Automatic Stay Bolt Drilling Machine, 1—M.D. Horizontal Cylinder Boring Machine, 1—M.D. Horizontal Boring, Facing and Milling Machine, 1—M.D. Double Head Vertical Boring and Turning Mill, 2—M.D. Milling Machines (assorted), 5—B.D. Milling Machines (assorted), 4—M.D. Planing Machines, 1—B.D. Planing Machine, 1—M.D. Shaping Machine, 7—B.D. Shaping

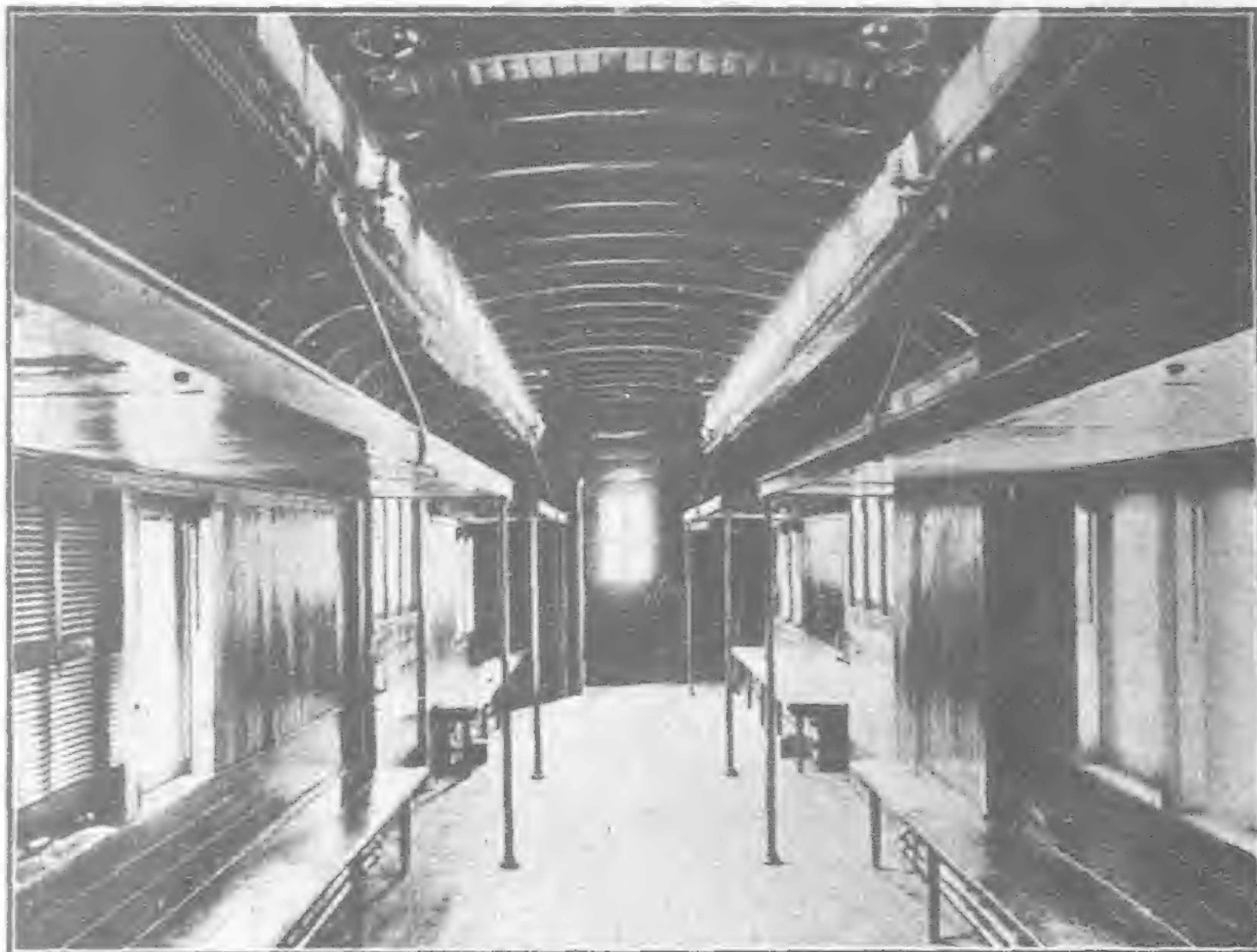
Machines, 1—M.D. Slotting and Milling Machine, 1—B.D. Slotting and Milling Machine, 3—B.D. Slotting Machines, 5—B.D. Grinding Machines (assorted), 1—B.D. Punching and Shearing Machine, 1—M.D. Automatic Screwing Machine, 7—B.D. Screw Threading Machines, 1—M.D. Bar Reeling Machine, 1—M.D. Centering Machine, 2—M.D. Polishing Machines, 1—M.D. Metal Sawing Machine, 1—B.D. Metal Sawing Machine, 3—M.D. Grinders for Tools and Cutters, 9—B.D. Grinders for Tools and Cutters, 1—M.D. Hydraulic Wheel Press, 1—Electric Tool-steel Tempering Furnace, 1—File Sharpener, 4—Copper Smith and Tool Smith Fires with M.D. Fans, 1—M.D. Smoke Exhaust Fan, 1—Electro-Plating Plant, 4—B.D. Polishing Machines for Electro-Plating Plant and 1—B.D. Band Saw for Timber.

Smith Shop.—2—Scrap Heating Furnaces with each Babcock & Wilcox Water Tube Boilers mounted on top of the furnace, 1—Cochran Vertical Boiler, 7—Miscellaneous Furnaces, 41—Smith Fires, each with M.D. Fan, 6—Steam Hammers (assorted), 1—M.D. Pneumatic Power Hammer, 1—Battery of Steam Drop Stamp Forge, consisting of 3 Heads, 2—Hydraulic Presses, 1—B.D. Bolt and River Heading Machine, 1—M.D. Hot Nut Press, 1—M.D. Duplex Power Press, 1—B.D. Punching and Shearing Machine, 1—B.D. Emery Tool Grinder, 2—M.D. Spring Making Machines, 1—Spring Test Machine and 1—M.D. Smoke Exhaust Fan.

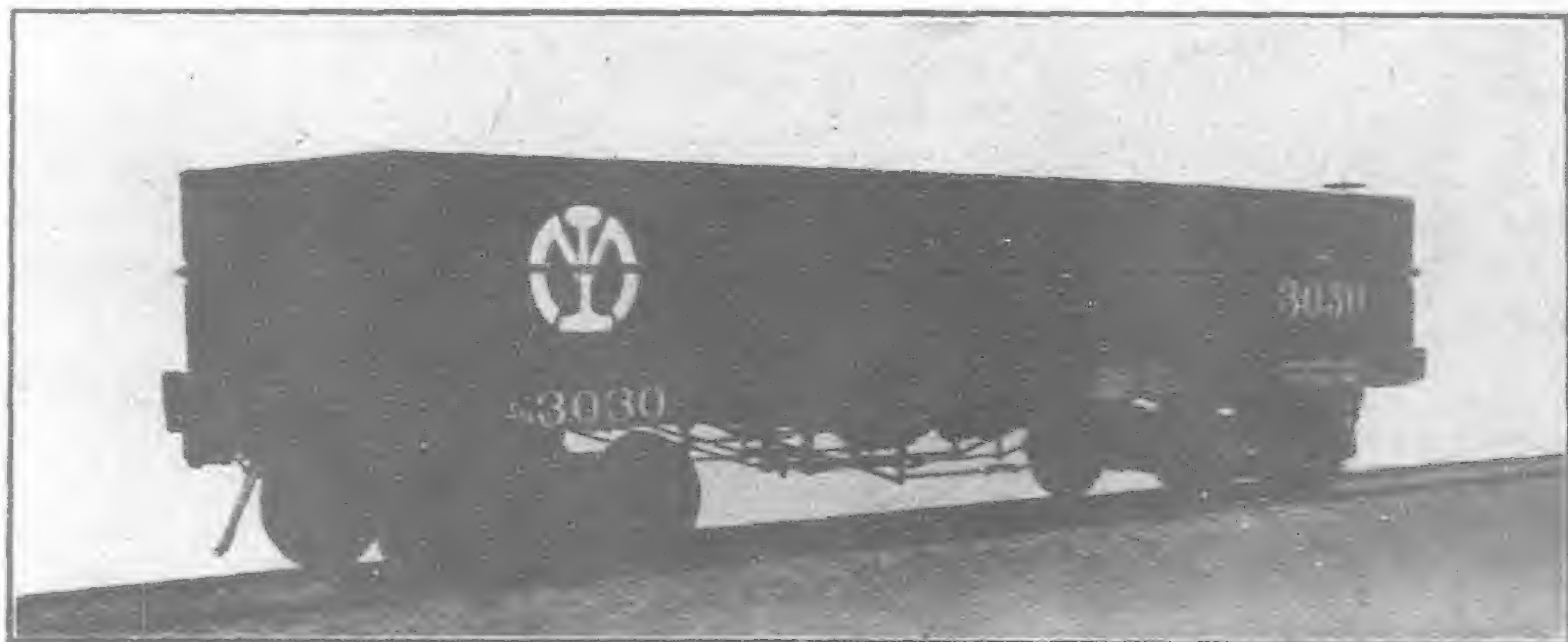
Foundry.—2—Cupolas, 1—Emergency Cupola with M.D. Fan, 1—Tilting Brass Melting Furnace with M.D. Fan, 1—Radio Brass Melting Furnace with M.D. Fan, 3—Mould and Core Drying Chambers, 1—Pipe Core Drying Pit with M.D. Fan, 2—B.D. Root's Blowers, 1—M.D. Scrap Breaking Plant, 1—M.D. Pig Iron Breaking Machine, 4—B.D. Loan Mills, 1—M.D. Sand Mixer, 1—Pneumatic Sand Riddler, 3—Pneumatic Moulding Machines, 1—Portable Mould Dryer with M.D. Fan, 1—M.D. Coke Breaker, 1—M.D. Fetting Machine, 1—B.D. Fetting Machine, 1—

M.D. Tumbling Machine and 1—B.D. Tumbling Machine.

Pattern Shop.—1—M.D. Band Sawing Machine, 1—M.D. Circular Saw Bench, 1—M.D. Planing Machine, 1—M.D. Wood Turning Lathe, 2—Foot Power Wood Turning Lathes, 1—M.D. Fret Sawing Machine, 1—Hand Power Wood Trimmer, 1—Electric Clue Heater, 1—M.D. Dust Collecting Plant and 1—M.D. Ventilating Plant.



Third Class Car constructed at the Workshop.



30 ton Side Dumping Open Car.

Timber Drying Kiln.—1—Triple Duct Drying System, with Fans for Cold Air and Moist Air combined in one shaft, driven by Motor; and a suitable steam Heating Chamber with a Cochran Boiler.

Paint Shop.—1—M.D. Paint Grinding Mill.

Passenger Car Shop, Cabinet Shop and Unholstering Dept.—1—Steam Veneer Press, 1—M.D. Band Sawing Machine, 1—M.D. Circular Saw Bench, 3—M.D. Planing Machines, 1—M.D. Boring Machine, 1—M.D. Tenoning Machine, 1—M.D. Horizontal Mortising Machine, 1—M.D. Wood Turning Lathe, 1—M.D. Sand Preparing Machine, 1—M.D. Circular Moulding Machine, 1—M.D. Scraping Machine, 1—M.D. Dust Collecting Plant, 1—M.D. Motor Ventilating Plant, 1—M.D. Vacuum Cleaner, 1—Hand Power Horse-hair Carding Machine and 5—Sewing Machines (assorted).

Freight Car Shop

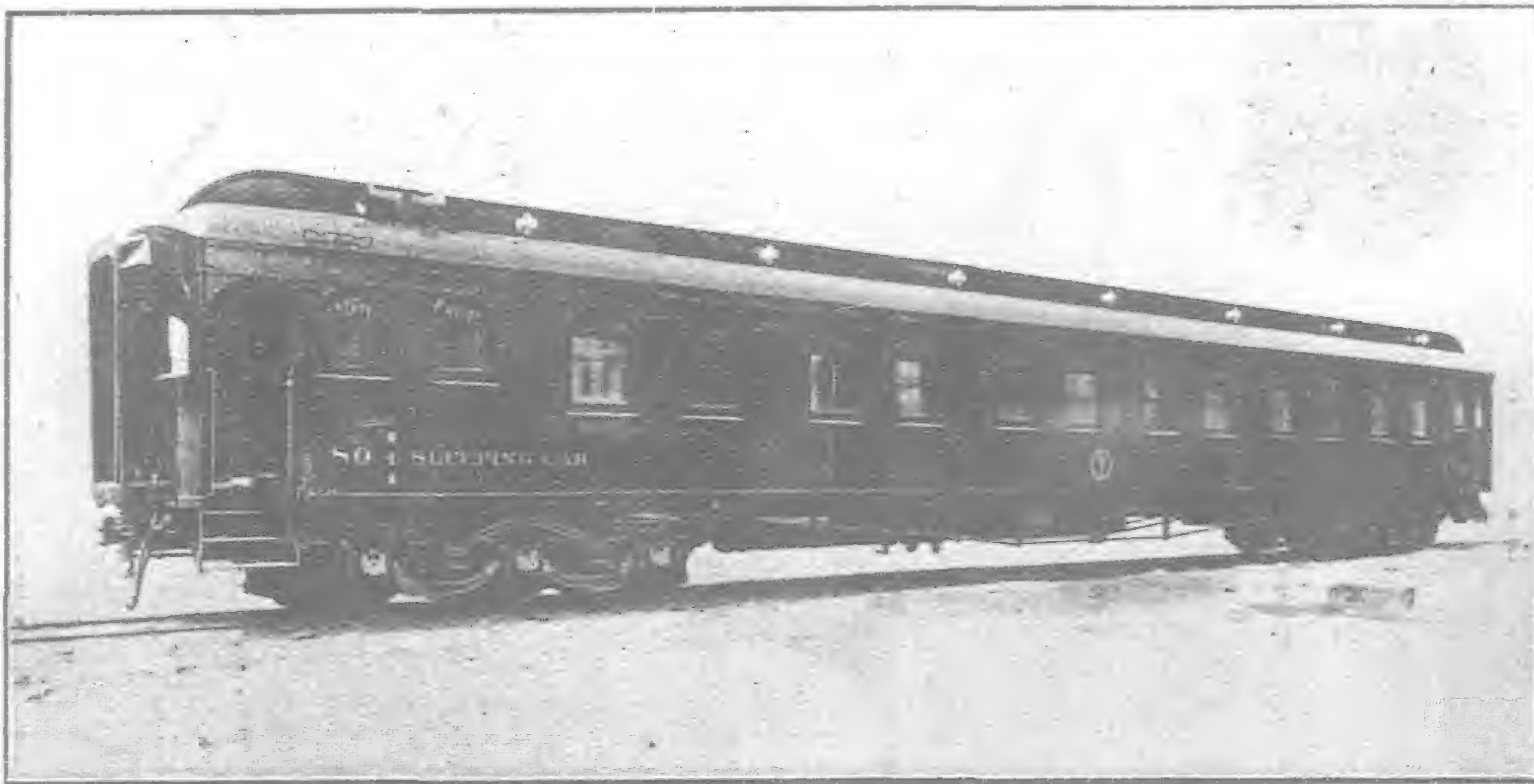
and Wood Mill.—1—M.D. Horizontal Log Band Sawing Machine, 1—M.D. Band Sawing Machine, 3—M.D. Circular Sawing Machines, 3—M.D. Planing Machines, 1—6—Spindle Boring Machine with Hollow Chisel Mortising attachment, 2—M.D. Tenoning Machines, 1—M.D. Vertical Hollow Chisel Mortising Machine, 1—M.D. Band Saw Sharpening Machine, 3—B.D. Cutter Grinding Machines, 2—B.D. Saw Sharpening Machines, 2—B.D. Band Saw Repairing Machines, 1—M.D. Dust Collecting Plant and 1—M.D. Motor Ventilating Plant.

Truck, Wheel and Brake Shop.—2—B.D. Vertical Boring and Turning Mills, 2—M.D. Centre Grip Wheel Lathes, 2—B.D. Wheel Lathes, 1—M.D. Axle Lathe, 1—M.D. Hydraulic Wheel Press, 1—M.D. Pneumatic Power Hammer, for Tyre Fastening,

5—B.D. Drilling Machines, 3—B.D. Lathes, 1—B.D. Break Lathe, 1—B.D. Punching and Shearing Machine, 1—B.D. Shaping Machine, 7—B.D. Screw Threading Machines, 1—M.D. Pipe Threading Machine, 10—Smith Fires, each with M.D. Fan, 1—Tyre Heating Furnace burning oil Fuel, with M.D. Fan and 2—Air Brake Triple Valve Testers.

General Stores.—M.D. Metal Sawing Machine.

Power House.—2—400 KW. Dynamos directly coupled to Vertical Compound Non-condensing Steam Engines, 2—250 KW. Motor Generators, 1—Set of Switch Boards, 1—Air Compressor, 1—Steam Fire-Service Pump, 3—Batteries of Babcock & Wilcox Water Tube Boilers, with Chain Grate Mechanical Stokers, Coal and Ash Conveyor, Fuel Economiser, Water Softening Plant & Co. Recorder Attachment and 3—Boiler Feed Steam Pumps.



First Class Sleeping Car.

Testing Laboratory.—1—Hydraulic Material Testing Machine for Tensile, Compression, Bending and Shearing Tests, 1—Hand Power Torsion Testing Machine, 1—Prinell Ball Testing Machine, 1—B.D. Lubricating-Oil Testing Machine, 1—M.D. Cylinder-Oil Testing Machine, 1—B.D. File Testing Machine, 1—Combined Pressure Gauge and Vacuum Gauge Tester, 1—B.D. Lathe, 1—B.D. Milling Machine, 1—B.D. Hydraulic Power Pump and an equipment for Chemical Tests.

Fire Bridge Station.—Portable Fire Engine and 1—Hand Power Fire Pump.

NOTE.—M.D. denotes that the machine is driven by a Motor Independently.

B.D. denotes that the machine is driven by a Belt and grouped with other machines; all being driven by a common motor.

THE PEKING SYNDICATE.

The Board of the Syndicate gives the following information regarding questions in connexion with the Shansi oil concessions since the annual meeting:

Pursuant to the China (Amendment) Order in Council, 1913, which requires that companies incorporated in the United Kingdom, and carrying on business in China, shall be registered at the Consulate of the district in which their chief local office is situated, the Peking Syndicate has been registered at H. B. M's Consulate-General in Tientsin. Statements having appeared in the newspapers that foreign companies were being given, or, at least, were applying for, exclusive rights on the oil and other mineral deposits of the province of Shansi, the directors called the attention of the Foreign Office to the agreement between the Shansi Bureau of Trade and the Peking Syndicate, dated January 21, 1908, for the redemption of the Shansi concession, a clause of which stipulates in substance that no arrangement can be made in future with foreign capitalists for the financing of a mineral enterprise without the Peking Syndicate being approached in the first instance. The operations of reopening pit No. 4 have been proceeding satisfactorily. The output has now reached about 13,300 tons per fortnight; the output immediately preceding the inundation of water (September 1912) had been 13,367 tons per fortnight. A fall in sales is due partly to the necessity of readjusting the whole commercial department on new lines and partly to the abnormally warm weather experienced in the winter months. An agreement has been entered into for the transportation of coal by water from Taokou to Tientsin at a considerable reduction of the rates formerly charged. The briquette-making plant, after remaining idle during the winter months, has been started again.

A prospecting, or development, department has been formed for the purpose of extending the Syndicate's operations, investigating business propositions, and tendering for either mining or constructional engineering work of all kinds. An arrangement has already been made through this new department with the Tun Hsing Sino Foreign Coal Mining Company, Ltd., for boring at their mines at Mentakou, near Peking.

The £800,000 of the Chinese Imperial Government Honan Railway 5 per cent. gold loan of 1905 has been successfully offered for sale for the

purpose of re-investing funds in Chinese Government Treasury Bonds at a higher rate of interest. Part of the company's participation in the Banque Industrielle de Chine has been realized at a substantial profit. The Syndicate has taken a participation of 10 per cent. in the company to be established for the construction and maintenance of tramways, electrical lighting, and waterworks in Peking, which have been entrusted to the Banque Industrielle de Chine. The Board's fixed policy is to work in close touch and harmony with the Chinese authorities.

UNITED STATES STEEL PRODUCTS CO.

The third (1914) edition of the General Catalogue of the United States Steel Products Co., is worthy of the Company responsible for its publication. From a typographical point of view alone it is noteworthy, as it is excellently printed in clear type and the illustrations are splendidly reproduced. There are in all 615 pages.

Some idea of the scope of the volume can be gained when it is mentioned that the index, which is printed in small type, occupies no less than 22 pages. Steel products of all kinds are described with tabulated information on every essential point, and illustrations are given to make the descriptions still plainer. It would be difficult to find any product of steel that is not described in this catalogue, but we learn that there are many special articles not enumerated, which are dealt with from time to time in separate pamphlets.

Although the cost of preparing this catalogue must have been enormous, we understand that those genuinely interested can obtain copies if they apply to the United States Steel Products Company, 24A. Kiangse Road, Shanghai.

THE FAR EASTERN REVIEW

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SPECIAL MINING NUMBER

Owing to the war, it has been found impracticable to publish the Special Mining Number of the FAR EASTERN REVIEW on the date originally proposed. An announcement in regard to the date of publication will be made in due course.

THE WAR AND CHINA

It is solely with the economic aspect of the war, especially in relation to the Far East, that this journal is concerned. The political considerations involved are not matters for discussion in the columns of a paper that has consistently upheld the ideal of Equal Opportunity in China. To seek to further the interests of China and all foreign nations possessing trading connections with the Republic has always been the aim of the REVIEW, coupled, of course, with the desire to assist in the extension of the use of foreign manufactures in the Philippines, Japan and throughout the Far East. The place of origin of such manufactures has had for us only the same academic interest that it possesses for the compilers of Customs statistics. It is true that, in cases where there was what we considered to be unfair discrimination against a particular country in the drawing up of specifications we have frankly protested. The object of that protest, however, was not to advance the interests of one country to the detriment of others, but to secure fair play all round. This having been our attitude since the first issue of the REVIEW saw the light, our readers will appreciate our policy of restraint in regard to the political problems brought into prominence by this unhappy war.

That trade and commerce in the Far East must suffer is inevitable. Operations in the trading and commercial worlds are based almost entirely upon credit. A widespread state of war means the suspension of credit and consequently the practical suspension of commerce. Local trade can still progress in a measure, but is necessarily restricted. The wealth in specie or bullion of the nations engaged in war, instead of being employed for the support of commercial credit, is devoted to the maintenance of the national credit, serious impairment of which would render victories in the field but empty triumphs. It is as if broad streams which normally irrigated fertile stretches of country were dammed back so that the waters spread over rocky, intractable ground—from which no crops could ever accrue—and incidentally overwhelmed other tracts which formerly were productive. The wealth that formerly was employed to create wealth, in time of war is used to destroy the wealth that already exists. The immediate effect is felt by the belligerent nations, but when, as is now the case, nearly all of the great manufacturing countries are engaged, the reaction affects the remotest parts of the globe. The mercantile shipping of the belligerents is port-bound as long as hostile naval forces exist capable of preying upon sea-borne commerce. Neutral shipping, it is true can still operate, but even in their case their rights of operation are gravely restricted by the law of neutrality. As the countries with the greatest aggregate of mercantile shipping tonnage are at war, considerable interruption of oversea commerce is certain. The British Government, however, has officially announced that all waters except the North Sea are "open," and this means that British, French and neutral shipping can, as heretofore, carry on oversea trade. But, until the cessation of hostilities, manufacturing will entirely cease in some countries and be greatly curtailed in others. Moreover, the debtor nations, which depend for their material progress upon financial assistance from Europe, are thrown upon their own resources and consequently new works and extensions will have to be deferred for an indefinite period. These are facts which will have to be taken into calculation when endeavouring to forecast the economic effect of the war upon China.

The latest Customs returns showing the trade of the belligerents with China are of timely interest. The value of

the direct trade with each of the belligerent countries is as follows:—

| | | | | |
|-------------------|----|----|----|-------------|
| Austria-Hungary:— | | | | Hk. Tls. |
| Imports from | .. | .. | .. | 4,121,913 |
| Exports to .. | .. | .. | .. | 1,550,175 |
| Total | .. | .. | .. | 5,672,088 |
| Belgium:— | | | | |
| Imports from | .. | .. | .. | 15,830,838 |
| Exports to .. | .. | .. | .. | 6,546,398 |
| Total | .. | .. | .. | 22,377,236 |
| France:— | | | | |
| Imports from | .. | .. | .. | 5,299,517 |
| Exports to .. | .. | .. | .. | 40,749,782 |
| Total | .. | .. | .. | 46,049,299 |
| Germany:— | | | | |
| Imports from | .. | .. | .. | 28,302,403 |
| Exports to .. | .. | .. | .. | 17,025,224 |
| Total | .. | .. | .. | 45,327,627 |
| Great Britain:— | | | | |
| Imports from | .. | .. | .. | 96,910,944 |
| Exports to .. | .. | .. | .. | 16,346,413 |
| Total | .. | .. | .. | 113,257,357 |
| Japan:— | | | | |
| Imports from | .. | .. | .. | 119,346,662 |
| Exports to .. | .. | .. | .. | 65,544,186 |
| Total | .. | .. | .. | 184,890,848 |
| Russia:— | | | | |
| Imports from | .. | .. | .. | 22,152,888 |
| Exports to .. | .. | .. | .. | 44,921,437 |
| Total | .. | .. | .. | 67,074,325 |

In addition the imports from Hongkong are of a total value of Tls. 171,636,099 while the exports to the British Crown Colony are of a value of Tls. 117,128,661. There is also a considerable trade with French Indo-China, Singapore, British India, Australia and Canada. It will be found that the total trade of China with Germany and Austria-Hungary amounts to Tls. 50,999,515. Unless arrangements could be made to carry this trade in neutral bottoms, which is improbable, it will entirely cease. As the Allies maintain command of the seas it is probable that the trade will flow into new channels, and the dislocation, as far as China is concerned will be of short duration. As America is in the fortunate position of being aloof from the conflict, she has an exceptionally good opportunity of increasing her trade with China. This amounted in 1913 to Tls. 73,077,499 namely, imports from Tls. 35,427,198, and exports to Tls. 37,650,301. If the opportunity is taken these figures should be greatly increased in the near future.

The situation affords no justification for undue pessimism. Adjustment to altered conditions will probably be embarrassing at first, but China is too huge a potential market to be neglected. Experience has shown that wars are usually followed by a burst of financial and commercial activity. In Japan, for example, after the war in 1904 there was the biggest boom experienced in the history of the country. China will still present almost boundless possibilities for commerce and the investment of capital, and, although the available capital of the world will have been enormously decreased by the war, China is certain still to attract a fair measure of attention. With a Government in China strong enough to keep the country in order investments of capital in the country might become more popular than before as, strange though it seems to write and read it, there is apparently as much security in China under a strong Government as there is in Europe.

It is unlikely, always assuming that the rebellious element within and without China fails to disturb the peace of the country, that dangerous pressure will be exerted by foreign

nations. Territorial readjustments in Europe and elsewhere are likely to keep the European Powers fully occupied, and there is no reason to suppose that the existing agreements to respect the territorial integrity of China will not be respected. China, peacefully progressing, will present a market too valuable to be overlooked, and we feel confidence in prognosticating that, when violent cupping has purged the war fever, the trade of China, both import and export, will not only recover lost ground but develop to an extent hitherto apparently beyond the pale of possibility.

GERMAN INTERESTS IN CHINA

While the war now proceeding in various parts of the world will impose an economic stress of tremendous force upon the various nations engaged none is likely to feel it more than Germany. Coincident with the development of her great fighting machine she has built up a commercial spirit which has blossomed and borne rich harvests, and had prosaic commercialism been sufficiently powerful or rapid in its growth to eclipse the splendor of spectacular militarism Germany would undoubtedly have earned for her growing genius for organised trade a large place in the world's economic progress. What we are particularly interested in is her activity in China; an activity which is now likely seriously to be retarded by a conflict produced by the mischievous and unrestrained power of the military. What Germany has done along commercial and industrial lines in China in the immediate past is well known, but what she may have done in the future had not the grim commands of war called a halt, is only indicated by the movement which had just managed to get afoot in the Fatherland before the outbreak of hostilities.

In a recent issue of the "Times" it was pointed out that "for some considerable time past the development of Germany's economic interests in China has been becoming a new catchword of German politics," and the writer went on to show what the catchword had developed into. He says:—The subject was discussed at length in the secrecy of the Budget Committee, and there was hardly a speaker who did not refer to it in the Reichstag debate on the Foreign Office Estimates. The Reporter on the Estimates, Herr Bassermann, said that grave anxiety had been expressed that Germany was being outpaced in China by other European Powers and by Japan. Herr Spahn, who said that China was the greatest foreign market still open to competition, complained of the lack of interest in Germany and of the defects of organization due mainly to the concentration of financial resources in a small number of large banks. Herr Gothein and others told the same tale. The representatives of the Government said they must admit the defects of German financial organization, and the fact that, since industrial loans last autumn were thrown open to competition, valuable industrial concessions had been secured by foreign countries. They also indicated that Government support would be given to efforts which are being made to create a German industrial organization for China independent of the Deutsch-Asiatische Bank.

It is doubtful whether all the makers of speeches are much more clear about what they want in China than when they thunder about the opening up of Turkey and Germany's claim to a "place in the sun" there or in South America, or in any other profitable part of the world. The demand for new "industrial" organization is, however, incessant, although there is considerable obscurity about the scheme actually contemplated. The movement is said to have originated, strangely enough, in certain Austrian successes in China, which were secured while the Financial Concert, from which Austria was excluded, was in full operation. The chief organizers seem to be the banking-house of Schroeder at Hamburg, which is one of the most important German houses not included in the comprehensive syndicate known as the Deutsch-Asiatische Bank. The scheme is doubtless intended to comprise all the most important German industrial concerns, and there is some reason to suppose that it is desired to secure English co-operation. The theory that

Germany and England are now natural partners in Chinese business is being systematically propagated. It is certainly held in high political quarters, as well as in financial and commercial circles, which have always maintained that the Six Powers group was a farce kept up in the political interests of the Powers which could not find money.

Until more definite information is provided regarding the new scheme it will be well to bear in mind some facts of the present position in Germany. The public and Parliamentary complaints and the new industrial proposals are based nominally upon dissatisfaction with the Deutsch-Asiatische Bank. It is no doubt true that a close financial syndicate is not the best source of initiative and is not likely to look eagerly for "new business" and to seize upon any opportunity that arises. At the recent general meeting of the bank it was admitted that proposals were made from time to time for the support of Chinese undertakings, such as coalmining, iron production, construction of private railways, cement and sugar factories, and so on; but the conditions in China, where the investors in such undertakings would have no guarantee, and the conditions imposed upon the German Bourses, make all such proposals unacceptable. Herr Dernburg, who is being much criticized for "frightening German capital away from China," put the matter very plainly in a letter to the *Berliner Tageblatt*. He showed that foreign industrial undertakings are seldom placed on the German market, because the risks to which company promoters are exposed by German law are too great; because new issues in Prussia are entirely under the control of the Government, which is guided mainly by the desire not to force up the rate of interest; and because there is in these circumstances no public in Germany with an appetite for foreign shares. These are very important considerations, which are of some interest to foreign countries.

One might illustrate the revival of German interests in China in various ways. It is not many years since proposals were constantly made to get rid of Kiaochow altogether. Now one finds nothing but articles and lectures insisting upon its importance, and it is worth nothing that the subject is especially popular in naval quarters. The most definite development, however, is the further improvement of the shipping services. The revision of the shipping subsidy agreements and the new working arrangements between the North-German Lloyd and the Hamburg-Amerika Line mark a determined effort to strengthen the

German position. Whereas at present there is a single subsidized fortnightly service of the North German Lloyd, the Hamburg-Amerika Line is opening in October its new monthly passenger and postal service with ships of a speed of 15 knots, and the North-German Lloyd is continuing its fortnightly service, without a subsidy, but under a new contract with the Government. The speed of the ships has to be increased from 14 to 14½ knots, and the company undertakes to give priority to German over foreign freights and to carry official passengers and official cargoes at 20 per cent. below the ordinary rates. The main point of the agreement seems to be that, while the North-German Lloyd continues to secure the postal carrying trade, it obtains a greater freedom for the development and organization of its freight business than was possible under the agreement by which a fixed subsidy was paid, and the Government had full control of the service. It is argued that Government control has not proved a really valuable check upon freight rates for German exports, which have in practice to be adapted to international conditions.

Germany attaches special importance to independent services to China because of political considerations, among which direct communication with German warships and with Kiaochow is not forgotten; but, as has appeared in other directions lately, her policy in regard to the Far Eastern services is only part of a general policy of increasing by every possible means direct German trade with every important oversea market and promoting trade upon the lines of absolute independence of foreign ports and foreign ships.

The result of the war will, of course, determine what is to become of the many schemes which have been developed not only by Germany, but by other countries, for operation in China. That they will be set back for a considerable period, no matter who is victorious, goes without saying, and the only Powers capable of adequately developing the large field awaiting exploitation in China are those who have kept their purse strings free from the entanglements of armed conflicts. The largest investors in China were Great Britain, France, Germany and Belgium, and the finances of all of these nations will become so strained by the war and the resultant economic upheaval that it will be many years before there is likely to be a free flow of money available for employment in China. The needs of this country in the immediate future, therefore, will have to depend upon local resources and whatever capital may be available in America for industrial and economic development.

KNITTING MACHINES IN CHINA

Considerable expansion occurred during the past 12 months in the knitting industry at Swatow, not only in increased numbers of home workers, but also in the establishment of a steam driven factory, which was to commence operations in July, 1914, reports Mr. Myrl S. Myers, American Consul-General at Swatow. Heretofore, except for a small factory at Chaoyang, in which 20 hand machines were operated, this industry has been confined to the homes of the operators. It is, therefore, apparent that this factory marks an entirely new development in this industry locally, and should the venture prove profitable, it is reported that further expansion will follow.

The factory is 128 by 53 feet and 32 feet high, built of a kind of concrete, which is used extensively in all native construction work. The machinery will include 40 American automatic machines, 200 and 220 needles each, for knitting socks, 4 American winding machines, and about 20 machines for making towels, nets, and grass matting. A small steam laundry will also be run in connection with the knitting plant. The motive power will be furnished by a 40 horsepower steam engine and ordinary tube boiler. The building cost \$9,000 gold, power plant \$3,500, machines and accessories \$22,500. The factory will have a maximum daily output of 300 dozen pairs of socks, 50 dozen towels, and, in addition, nets and grass matting. About 200 hands will be employed, mostly girls and women, whose wages will average \$2.50 monthly with free board.

As has been noted, the home knitting industry expanded during the past year. Thirty-six hand machines for knitting socks and 10 semi-automatic ones were put into operation—increases of over 15 and 28 per cent. respectively. The new hand machines are largely English, while the semi-automatic ones are American. By the addition of these new machines the maximum output may be said to have increased by about 100 dozen pairs of socks per day. Five new machines for knitting coarse cotton sweaters were also started during this period.

CARNEGIE POCKET COMPANION

The Carnegie Steel Co., one of the subsidiary companies of the United States Corporation have just issued a new Pocket Companion which supersedes the old edition as published in 1903.

The Pocket Companion is intended especially for Engineers, Architects and Builders as a Hand-Book containing useful information and tables appertaining to the use of Steel.

These Pocket Companions are gotten up at considerable cost both in the way of direct labor in making the calculations for all the tables contained therein as well as the cost for publishing the book, which is printed on special India paper and contains about twice as much information as is usually found in the ordinary Hand-Book, and occupies about half the usual room.

The nominal charge for this publication is G. \$2.00 per copy, but to *bona fide* Architects, Students and Universities who express a desire for same, the United States Steel Products Co., of 24 A Kiangse Road, Shanghai, will be pleased to furnish them gratis.

COAL IN THE PHILIPPINES

A HUGE DEVELOPMENT COMPANY

The *Manila Daily Bulletin* reports that capital to the amount of P. 3,600,000 has been secured for the development of the rich coal district along the Bisbig river in Mindanao, discovered some years ago by Mr. F. L. Cunningham.

The coal lands to be developed are situated on the east coast of Mindanao about half way between the northern extremities of the island. They are traversed by the Bisbig river which empties into a harbor capable of being converted into a first-class port by the expenditure of comparatively little money.

There are three veins of good coal on the property. One vein has a depth of five and a half feet, and the third, as far as it has been traced, gives indications of exceeding the other two in extent and richness. The coal is of a quality superior to that mined at one time at Bataan, and prospects for the establishment of a coaling station at the mouth of the Bisbig are said to be very bright.

In addition to its mining venture the capitalists interested intend to install a saw-mill and exploit the promising forest resources of the Bisbig district. This end of the enterprise is not fully determined, however, as the necessary concessions have not as yet been obtained from the government.

THE PROTECTORATE OF KIAOCHOU

While the titanic clash of arms in Europe engrosses attention elsewhere residents of the Far East naturally felt particular interest in the fate of the leased territory of Kiaochou. It was realized as soon as the general war became imminent that Kiaochou was likely to be the scene of a naval and military conflict between the forces of the Triple Entente and those of Germany, aided, perhaps, by the small Austrian naval detachment in Far Eastern waters. While the Allies had a naval preponderance, it was recognised that actually to take the city of Tsingtao would involve the co-operation of land forces with which the Allies were none too well equipped. It seemed, therefore, as if there were a probability of operations in which the chances of success were fairly equal.

From many points of view it was felt, even by the belligerents, that it would be advantageous if some formula could be found by which Kiaochou could be removed from the area of conflict. Its capture or retention by Germany could not have the slightest effect upon the war itself, and for reasons that are sufficiently obvious it was deemed highly undesirable that

European forces should fight on Chinese soil. There is reason to believe that the Allies held their hand in the hope that conversations that were proceeding between the Ministers of the Powers interested would prove successful. It is thought in some quarters quite possible that a satisfactory arrangement might have been made, but on August 15 Japan issued an ultimatum to Germany in the following terms:—

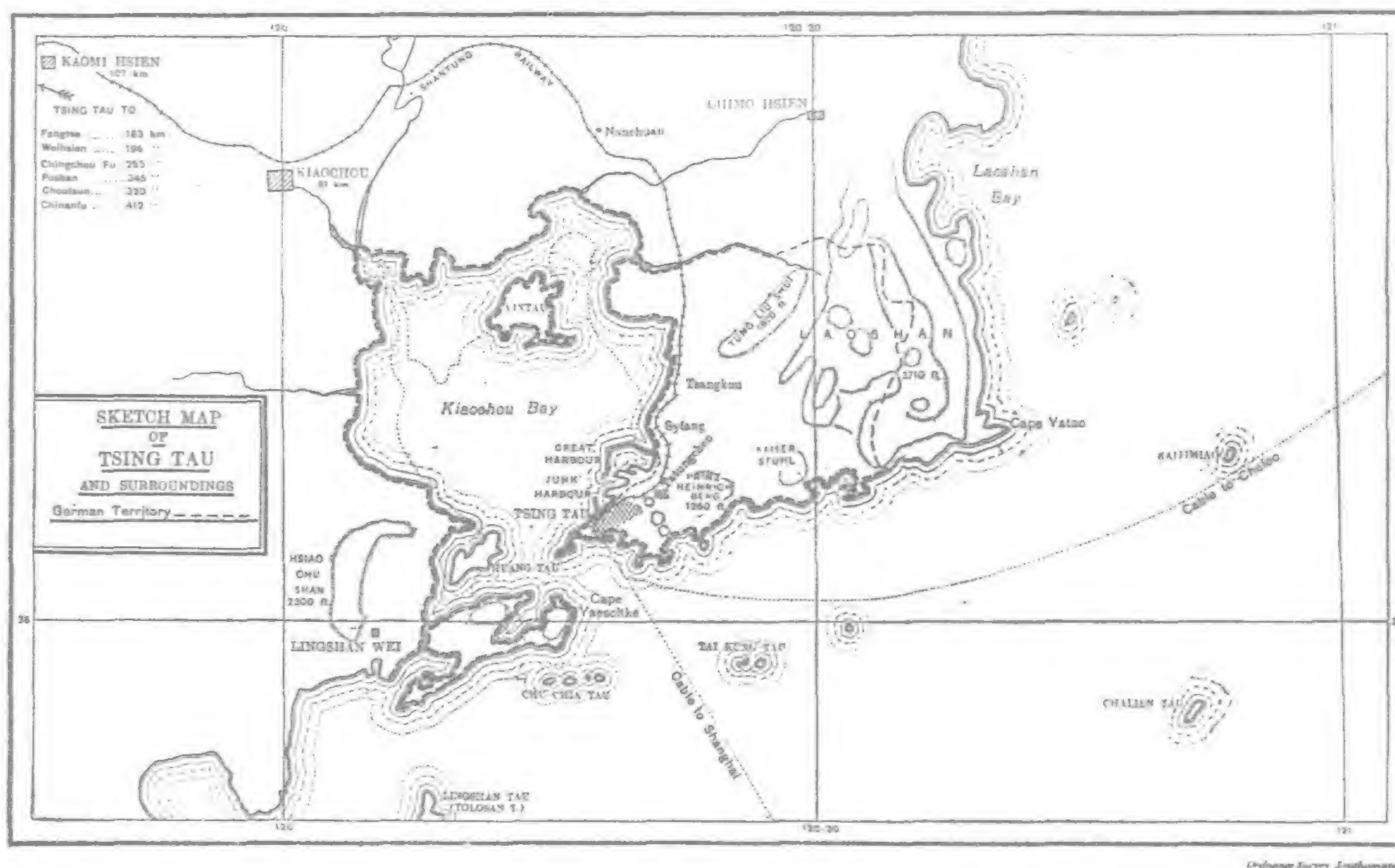
"We consider it highly important and necessary in the present situation to take measures to remove the causes of all disturbances of peace in the Far East and to safeguard the general interest contemplated by the agreement of Alliance between Japan and Great

Britain in order to secure a firm and enduring peace in Eastern Asia, the establishment of which is the aim of the said agreement. The Imperial Japanese Government sincerely believe it their duty to give advice to the Imperial German Government to carry out the following two propositions: Firstly, to withdraw immediately from Japanese and Chinese waters German men-of-war and armed vessels of all kinds and to disarm at once those which cannot be so withdrawn, and, secondly, to deliver on a date not later than September 15 to the Imperial Japanese authorities, without condition or compensation, the entire leased territory of Kiaochou with a view to the eventual restoration of the same to China.

The Imperial Japanese Government announce at the same time that in the event of their not receiving by noon, August 23, 1914 the answer of the Imperial German Government signifying unconditional acceptance of the above advice offered by the Imperial Japanese Government, they will be compelled to take such action as they may deem necessary to meet the situation."

This, of course, entirely altered the aspect of affairs. Being couched in such terms it was hardly to be believed that Germany would accept the terms of the ultimatum, although resistance against the overwhelming forces that Japan would bring to operate held out no prospect of success.

The town of Tsingtao, which is situated at the entrance of



Kiaochou Bay in Shantung province, was occupied by a German squadron on November 14, 1897 on account of the murder of two German missionaries. Subsequently on March 6, 1898, an area of about 200 square miles, exclusive of the bay, was transferred to Germany on a 99 years' lease. The district was declared a Protectorate of the German Empire on April 27, 1898. Surrounding the district and bay is a neutral zone, whose outer limit is 30 miles from highwater mark on the coast of the bay. Tsingtao was heavily fortified, docking facilities were provided for war vessels and a permanent garrison was installed



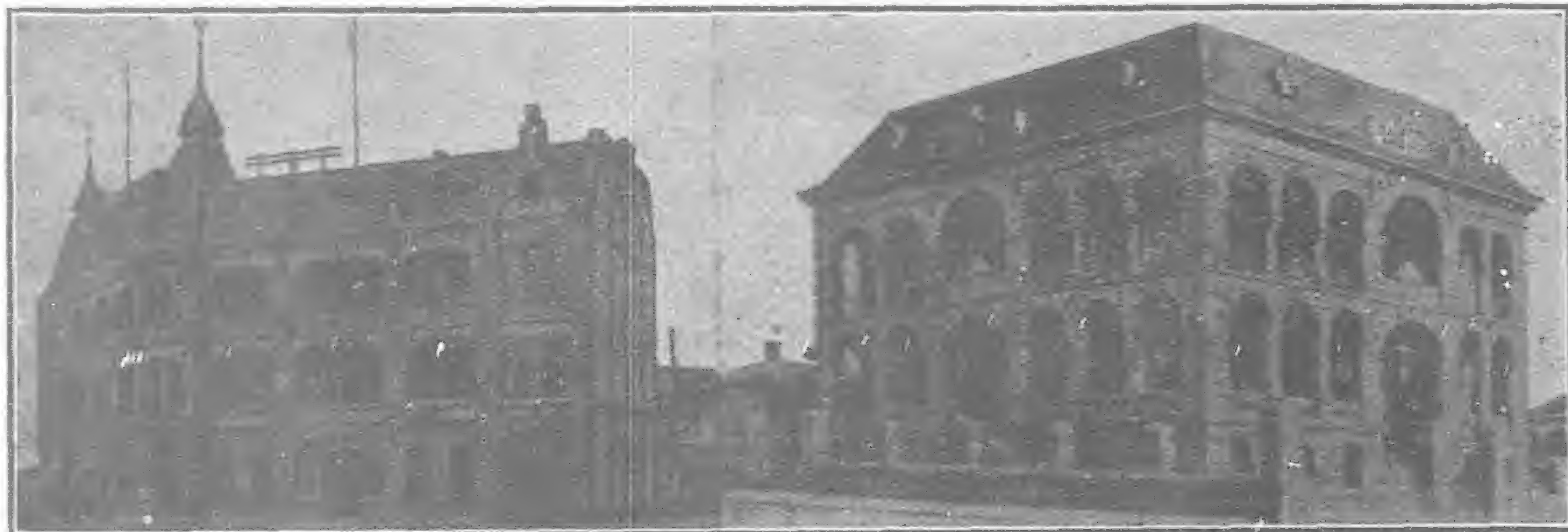
Tsingtao from the Bay.



A Street in Tsingtao.

Under German rule Tsingtao and district became one of the show places of the Far East. Magnificent roads were constructed and the public and other buildings which were erected could bear comparison with those of many of the great cities of Europe. On September 2, 1898, Tsingtao was declared a free port and the trade has increased to such an extent that in the last Chinese Customs report it was announced that Tsingtao was only surpassed in volume of trade by four other ports. The railway from Tsingtao to Tsinanfu was opened on June 1, 1904, and coal mines at Fangtse and Hungshan were rapidly opened up.* The right to build this railway and to operate the mines was conferred by the treaty of March 6, 1898.

The bay of Kiaochou is an extensive inlet about two miles north-west of Cape Jaeschke. The entrance is not more than 1½ miles across, the east side being a low promontory with rocky shores on which stand the town of Tsingtao. On the west side



German Post Office, Tsingtao.

Deutsche-Asiatische Bank, Tsingtao.

expected that in a little more than six weeks it will be ready to start work. The first evidence of this is an inquiry, appearing in this issue, by the mill for quotations on white linen rags, says the *Central China Post* of June 7, and continues:—

The reconstruction of the water tower has been the chief cause of delay in the last few months. Prior to the outbreak of the revolution in 1911 the tower was under construction and five of the eight struts which support the tank had been erected. The uprising put a stop to the work with the result that the half completed structure collapsed, damaging the struts so as to necessitate them being re-straightened. This work has taken something like four months and now the mill is only awaiting the finishing of the work on the tower.

Some of the most up-to-date improvements in the manufacture of paper are embodied in the mill, which is the most complete in China. It will be capable of manufacturing paper from either straw, rags or wood pulp, and in this connection will be largely experimental. The machines are two in number, one sixty and the other forty-eight inch, manufacturing bond paper for bank notes and paper for general use. The machinery is all American.

Few persons in Hankow have an idea of the vast size of the tract of ground taken up by the mill. This tract is bounded by the railway and the Seven Mile creek and is oblong in shape and although quite a large stretch is left for future extensions, it takes about ten minutes to walk from one end of the developed compound to the other. Along the creek the mill has an extensive bund and jetty while on the railway there is a special station.

The narrow creek crossed by the first of the railway bridges cuts across one end of the mill grounds, and constitutes a dividing line between the Chinese coolie residences and the business quarter. On the other side of the creek are three houses for foreign and Chinese superintendents and a mess for ten foreigners. Immediately alongside these are the office buildings, seen from the river, with the clock tower. Before and behind these buildings are two gold fish lakes on the edges of which willow trees are being planted. The mill proper with its godowns is placed in the centre of the compound while the rest of the ground is taken up by pumping house, filter beds, reservoirs, a straw storage godown and better class Chinese houses.

The mill building is shaped roughly like an E, the projection in the middle running through the back of the building. It is divided in two and



Artillery Camp, Tsingtao.

of the entrance is another promontory with hills rising to about 600 feet. The Chinese city of Kiaochou is about five miles from the sea, beyond the Protectorate frontier.

There are two anchorages at Tsingtao for big ships, the larger one being behind the east promontory and the other on the south side. Three moles for berthing ships have been constructed and these are connected with the railway.

The Japanese fleet was blockading the port when we went to press

* Articles on the Tsingtao-Tsinanfu Railway and other projected railways in Shantung appeared in the *FAR EASTERN REVIEW* of October and November, 1913.

GOVERNMENT PAPER MILL AT HANKOW

DESCRIPTION OF THE BUILDING

After what at first seemed interminable delays the government paper mill at the Seven Mile Creek is rapidly nearing completion and it is



Other Views of Tsingtao.



General View of Tsingtao.

constitutes the sorting rooms for rags and straw. The back line of the E, at each side of the projection is similarly divided into beaters' and chemical departments. The machines occupy the parallel lines of building at the top and bottom of the E while those curving from the ends to the centre are the delivery godowns. The power house runs parallel with the back of the block.

The majority of the buildings in connection with the mill are three storeyed and present quite an imposing appearance. The architects were Messrs. Atkinson and Dallas. An institute for teaching Chinese students the art of paper making in conjunction with the mill was suggested. However it is understood that this proposal has been shelved.

THE TRANS-SIBERIAN RAILWAY SERVICES

GROWTH OF THE TRAFFIC

The rapid increase in the traffic over the Trans-Siberian system to the Far East is to be directly attributed to the improvement in the facilities offered, says a correspondent of *The Times*. At the present time it is possible for a passenger to leave London on a Sunday and arrive at Shanghai *via* the Russian railway system in 14 days, against 35 days when making the journey *via* Suez; and when the railway improvements, which have now been sanctioned by the Russian Government, are completed, the time of the journey to Peking will be reduced by two days, and the journey will then take 11 days only. This is being accomplished by the increased mileage of double tracks on the route, by the provision of new bridges, and other permanent-way work. It is estimated that the total cost of the double tracking of the 2,150 miles of the Trans-Siberian route will amount to about £13,000,000. The expenditure ought to be justified by the traffic; it cannot be too strongly emphasized that whereas Russian railway enterprise in Asia was formerly connected with plans for territorial expansion and offensive strategy both in the Middle and the Far East, it is now based upon ordinary commercial considerations of Imperial defence, and the peaceful development of these vast territories.

THROUGH BOOKINGS

It was the policy of arranging through bookings with the English railways which has stimulated the use of the route by the travelling public. The question of arranging tickets to the Far East was first discussed in 1905, but it was not until 1908 that a system was brought into operation under which passengers could take tickets and register luggage through to certain towns in the Far East, the principal places being Vladivostok, Nagasaki, Tsourouga, Shanghai, and Harbin. The Russo-Japanese War interrupted the extension of these facilities, but when the normal working of the railways was resumed, conferences between the administrations of railways and steamship lines concerned were again held, with the result that the State railways of Japan and Korea have been brought into the arrangement, and last year the Chinese railways (Peking and Mukden line) agreed to the issue of tickets and the registration of luggage to Peking and Tientsin.

Passengers from England can travel by various routes. To take only one example, they can begin their journey by using the excellent daily services to Moscow *via* Harwich and the Hook of Holland, leaving Liverpool-street at 8.30 p.m. on Sunday evening, and arriving in Shanghai *via* Siberia on the Saturday week, that is, 14 days. It may be pointed out that the distance from the Hook of Holland to Alexandrowo is the shortest from any Channel port. The journey through Russia and over the Trans-Siberian route can be made either in the Russian trains or by the services of the Sleeping Car Company. The Trans-Siberian trains of the Sleeping Car Company are composed of first and second class cars. The first-class compartments contain two sleeping berths, also table, chair, special reading lamp, and ample hook and rack accommodation for hand baggage. In the second-class cars of the Sleeping Car Company's trains there are a limited number of two-berth compartments, the remainder containing four berths each. There are no two-berth second-class compartments on the Russian State or Chinese Eastern Company's trains. The cars are supplied with electric light, and heated during the winter. The *personnel* of the trains generally speak four languages—Russian, German, English, and French. On the Chinese portion of the journey the attendants speak Chinese and Russian. The latest telegraphic news is posted in the restaurant car.

SIX THOUSAND MILES OF RAILWAY.

Until these services were instituted the Trans-Siberian route was but little known. It was in the year 1903 that the through traffic facilities were first provided. In conjunction with the Russian and Chinese Eastern Railways the Sleeping Car Company established a through train on the railway, which begins at Alexandrowo or at Wirballen, and thence over the broad-gauge

railway of European Russia to Cheliabinsk, 2,311 versts from St. Petersburg. It is at this point that the two branch lines, one from St. Petersburg and one from Moscow, converge and connect with the Trans-Siberian Railway. From this station to Manchuria, a distance of 4,472 versts, the line runs right across Siberia through thousands of miles of forests and vast stretches of agricultural land, crossing several mountain ranges and important rivers to Manchuria. At Mandchuria, the first station in Manchuria, the Chinese Eastern Railway begins, and as this railway was built on the five-foot gauge, and is operated by the Russian Government, no change is necessary, after once starting on the Russian railways, until Vladivostok is reached, a distance of 1,604 versts. The distance traversed from St. Petersburg to Vladivostok is therefore 8,387 versts, or 5,560 miles. As Alexandrowo is 1,472 kilometres (915 miles) from Ostend, the total distance from Ostend to Vladivostok is 6,475 miles, or from London to Vladivostok 6,611 miles. By the route *via* St. Petersburg, Moscow, Samara, and Irkutsk it is 5,900 miles from St. Petersburg to Vladivostok, but by the northern route *via* Viatka the distance is reduced to the figure above mentioned. The last rail of this great enterprise was laid on November 3, 1901, but the line was not opened for permanent regular traffic until two years later.

NEW TRAINS AND FACILITIES

In addition to the through bookings *via* Siberia, a passenger can now take a round trip ticket from London to Shanghai by way of the Trans-Siberian Railways, and return from Shanghai to London available by any passenger steamer *via* the Suez Canal, the tickets being available for two years. This means that a passenger can now take a round trip ticket and register his luggage to Shanghai with no more trouble than he would have in booking and registering luggage to Amsterdam.

Further round-the-world facilities are under consideration, and it is expected that at the conference to be held in September next arrangements will be completed to enable a passenger to go out by the Canadian Pacific Railway, Cunard Steamship Line, or Hamburg-American Line services to the Pacific Coast, thence by steamer to Japan, and home *via* the Trans-Siberian Railways *via* Harbin, Mukden, Irkutsk, Moscow, or St. Petersburg; or the voyage may be taken in the reverse direction. To those whose leave is for a fixed period the saving of three weeks or more on the journey to and from home, is a great consideration; and in the course of a year or two it is most probable that the time taken *via* the Siberian Railways will be reduced. The growth of the traffic to the Far East since the Trans-Siberian through bookings were put into force has been remarkable, and the Russian State Railways have at the present time under consideration a question of new trains on the line between Wirballen-St. Petersburg, Alexandrowo-Moscow.

The administration of the Japanese State Railway and of the Manchurian Railways take a keen interest in the development of the traffic, and print the time-tables in English, and also publish guides in English.

A Board of Trade return states that the number of passengers, exclusive of season ticket holders, carried by British railways in 1913 amounted to 1,228,316,000, of whom 26,025,000 were first class, 12,088,000 second class, 933,498,000 third class, and 256,705,000 workmen. Their fares amounted to nearly £60,000,000. The total expenditure on railway working in 1913 was £78,803,000 and the total net income was £52,011,000.

The mileage of railways in Europe increased from 206,987 in 1910 to 212,651 in 1912, in America from 326,357 to 343,643, in Asia from 63,188 to 66,534, in Africa from 22,850 to 26,491, in Australasia from 19,229 to 21,678, and in the world from 638,611 to 670,997. Of the 212,651 miles in Europe at the end of 1912, 98,952 were privately owned, 321,406 out of the 343,643 in America, 22,694 out of the 66,534 in Asia, 10,656 out of the 26,491 in Africa, 2708 out of the 21,678 in Australasia, and 456,416 out of the 670,997 in the world.

THE HWAI RIVER CONSERVANCY COMMISSION

The labours of the American Red Cross Board of Engineers on Chinese Conservancy in connection with the investigation of the Hwai River Project are nearing their conclusion, that is to say as far as the actual field work is concerned. For the benefit of those readers who have not followed the development of American interest in flood prevention and cure in China it may be well briefly to explain what led up to the despatch by the

the possibilities. His excellent report (which was published in the FAR EASTERN REVIEW of November 1912) was the means of quickening the interest of the Chinese Government in the question, and at the end of 1913, a National Irrigation and Water Conservation Bureau of China was formed, with Mr. Chang Chien, Minister of Agriculture and Commerce, as its head.

A month later a preliminary agreement was signed by the



The Grand Canal. House-Boats of the American Red Cross Engineers.



On the Ming Dyke near the point where the Dyke and Canal diverge.

American Red Cross of a Board composed of the most distinguished authorities in America on water conservation and flood prevention.

The constantly recurring floods and attendant famines in China led to periodical appeals on behalf of the sufferers to the American Red Cross; appeals that were always received with generous sympathy. But the practical American mind realized

Chinese Government and the American Minister at Peking in regard to this work which contemplated the eventual flotation, by the aid of the American Red Cross, of a Hwai River Conservancy Loan of \$20,000,000, U. S. Currency at 5 per cent. Mr. C. D. Jameson immediately left China for America to report to the Red Cross with a view to having a Board of experts sent to China to report on the entire scheme.



The Famous Ming Dyke. Hungtze Lake.



The Grand Canal.

that far better than relief after the disaster would be prevention of the devastating floods. To ascertain how far it was feasible to restrain the unbridled Hwai River, which was the primary cause of the disasters which periodically overtook the unfortunates who lived in its basin, the Red Cross secured the services of Mr. C. D. Jameson, Mem. Am. Soc. C. E., to report on

The following Board was selected:—Colonel William L. Sibert, U. S. Army, Department of Engineering, Chairman; Mr. Arthur P. Davis and Professor D. W. Meade. A sketch of Colonel Sibert's career was given in our issue of June last. The reputation established by Colonel Sibert at the Panama Canal, where, it will be remembered, he designed and built the

Gatun Dam, enhanced that which he had gained during his ten years' experience of flood prevention on the Mississippi and Ohio. Mr. Arthur P. Davis, Chief Engineer of the U. S. Reclamation Service, has naturally special qualifications for the work that had to be done, while Professor D. W. Meade of the Wisconsin University is one of the most eminent consulting hydraulic engineers in America. That three such men, with Mr. Jameson as General Adviser, were to undertake the final investigations formed a guarantee that they would be carried out most scientifically and thoroughly. The Board brought with them a staff of specially selected American surveyors.

Before the departure of the party from America Mr. Jameson was able to submit the results of two additional years of instrumental surveys in the flood region by the Kiangsu survey students. It may be mentioned that subsequent investigation have shown that the levels and data collected during this period were accurate. These maps and plans, which were placed at the disposal of the Board, proved of the greatest assistance, and the excellent work, performed reflected the greatest credit upon Mr. Chang Chien, who for ten years had taken great interest in flood prevention and who was responsible for the education and appointment of the Kiangsu students

who have made these surveys. The Board of engineers arrived in Shanghai on June 28 and lost no time in beginning their investigations. Two parties were formed. The first party proceeded along the Grand Canal from the Yangtze to Tsing Kiang-pu. The other started at Haichow and checked back to Tsing Kiang-pu. One man was detached to check the levels down the Hwai River and across the Hungtze Lake.

An investigation was made of all the water courses along the Railway from Pukow to the Grand Canal down the Hwai River to Tsing Kiang-pu and then down the Grand Canal to the Yangtze. As a result of the investigation made it is probable that better results can be attained than Mr. Jameson indicated in his original report. There are no insurmountable difficulties in carrying out the work. It will not be a philanthropic one pure and simple, but will more than pay for itself as a business proposition.

The Board returned to Shanghai on August 24. The whole party left two days later for Hankow. Then they were to visit Kaifengfu, and make an examination of the Yellow River, as the condition of that river is rather an important factor. The party then goes to Peking, and will return to Shanghai to catch a steamer on September 19 for America. The Report of the Commission will probably be submitted to the Red Cross in October.



American National Red Cross Conservancy Engineers to China. Front row, left to right:— Mr. C. D. Jameson, General Adviser; Mr. A. P. Davis, Colonel Sibert, Professor Meade; Mr. Cornish, Principal Assistant.

FAR EASTERN RAILWAYS

CHINA

Kirin-Changchun Railway.—It has been decided to build a repairing shop at Changchun for the repair of rolling stock.

Nanchang-Kiukiang Railway.—A Japanese paper reports that on June 30 an agreement was concluded between the East Asia Development Co. and the Chinese company which has been building the Nanchang-Kiukiang railway, since 1906, for a loan of Y2,000,000. The line has been constructed between Kiukiang and Tehanhsien, a distance of about 35 miles, and it is hoped that the Y2,000,000 will be sufficient to build the remaining fifty miles. The interest on the loan is said to be 6½ per cent., and the principal is redeemable in twenty years.

Lanchowfu to Kuldja.—A Peking report states that a preliminary contract has been signed by the Chiao Tungpu and a Belgian syndicate to construct a line from Lanchowfu to Kuldja. It will be 1,850 miles long and will cost £12,000,000. The construction loan will be secured upon the line itself and mining concessions in Kansu and Sinkiang.

American Railway Material.—Consul-General F. D. Cheshire, stationed at Canton,

reports that the following purchases of railway material have been made from American manufacturers, values being in United States currency.

Canton-Kowloon Railway, locomotive electric headlights and car couplers, \$3,000; Canton-Hankow Railway, 5 locomotives of consolidated type, \$100,000; 60 covered freight cars, \$100,000; 40 open freight cars, \$50,000; 60,000 American redwood sleepers and large quantity of bridge and crossties, \$60,000; locomotive turntables, and steel bridges, \$26,000.

In addition sundry articles of American manufacture, such as electrical lamps, fans, railway, supplies, lubricating oils, etc., have been purchased in greater quantities, during the past year than ever before.

Shanghai-Nanking Railway.—The following figures of traffic returns (approximately) for the week ended July 25, are issued by the Shanghai-Nanking Railway:—

| Year. | Passengers. | Goods & Sundries. | Total for the week. |
|-----------|-------------|-------------------|---------------------|
| 1914.... | \$ 40,321 | \$ 13,903 | \$ 54,224 |
| 1913.... | 41,066 | 8,494 | 49,560 |
| Increase. | — | 5,409 | 4,664 |
| Decrease | 745 | — | — |

| For four weeks. | | | |
|-----------------|-------------|-------------------|------------|
| Year. | Passengers. | Goods & Sundries. | Total |
| 1914.... | \$ 149,374 | \$ 44,728 | \$ 194,102 |
| 1913.... | 168,920 | 39,272 | 208,192 |
| Increase. | — | 5,456 | — |
| Decrease | 19,546 | — | 14,090 |

| Week ended August 1. | | | |
|----------------------|-------------|-------------------|---------------------|
| Year. | Passengers. | Goods & Sundries. | Total for the week. |
| 1914.... | \$ 39,587 | \$ 13,746 | \$ 53,333 |
| 1913.... | 28,087 | 5,014 | 33,101 |
| Increase. | 11,500 | 8,732 | 20,232 |
| Decrease | — | — | — |

| For five weeks. | | | |
|-----------------|-------------|-------------------|------------|
| Year. | Passengers. | Goods & Sundries. | Total. |
| 1914.... | \$ 188,961 | \$ 58,474 | \$ 247,435 |
| 1913.... | 197,007 | 44,286 | 241,293 |
| Increase. | — | 14,188 | 6,142 |
| Decrease | 8,046 | — | — |

| Week ended August 8. | | | |
|----------------------|-------------|-------------------|---------------------|
| Year. | Passengers. | Goods & Sundries. | Total for the week. |
| 1914.... | \$ 43,608 | \$ 11,722 | \$ 55,330 |
| 1913.... | 28,884 | 5,598 | 29,480 |
| Increase. | 19,724 | 6,124 | 26,848 |
| Decrease | — | — | — |

| For six weeks. | | | |
|----------------|------------------|---------------------|---------|
| Year. | Passen- gers. | Goods & Sundries | Total |
| | \$ | \$ | \$ |
| 1914.... | 232,569 | 70,196 | 302,765 |
| 1913.... | 220,891 | 49,884 | 270,776 |
| Increase. | 11,678 | 20,312 | 31,990 |
| Decrease | — | — | — |

Week ended August 15.

| Year. | Passen- gers. | Goods & Sundries. | Total for the week. |
|-----------|------------------|----------------------|---------------------------|
| | \$ | \$ | \$ |
| 1914.... | 47,518 | 10,614 | 58,132 |
| 1913.... | 22,124 | 4,819 | 26,961 |
| Increase. | 25,394 | 5,795 | 31,171 |
| Decrease | — | — | — |

For seven weeks.

| Year. | Passen- gers. | Goods & Sundries | Total for the week. |
|-----------|------------------|---------------------|---------------------------|
| | \$ | \$ | \$ |
| 1914.... | 280,087 | 81,810 | 360,897 |
| 1913.... | 243,633 | 54,703 | 297,736 |
| Increase. | 37,054 | 26,107 | 63,161 |
| Decrease | — | — | — |

Week ended August 22.

| Year. | Passen- gers. | Goods & Sundries | Total for the week |
|-----------|------------------|---------------------|--------------------------|
| | \$ | \$ | \$ |
| 1914.... | 46,930 | 10,360 | 57,290 |
| 1913.... | *24,762 | *4,642 | *29,404 |
| Increase. | 22,168 | 5,718 | 27,886 |
| Decrease | — | — | — |

For eight weeks.

| Year. | Passen- gers. | Goods & Sundries. | Total. |
|----------|------------------|----------------------|---------|
| | \$ | \$ | \$ |
| 1914.... | 327,017 | 91,170 | 418,187 |
| 1913.... | 267,795 | 59,345 | 327,140 |
| Increase | 59,222 | 31,825 | 91,047 |
| Decrease | — | — | — |

*No traffic beyond Tanyang in 1913.

MALAYA

Singapore to Bangkok.—Says the *Malay Mail*:—The date on which it will be possible to go by rail from Singapore to Bangkok has been for long, and is likely to remain for some time yet, a fruitful source of speculation. Necessarily it can be little more.

We are gradually, however, approaching a point at which a date can be fixed with something very near certainty. From all the indications it would appear that, so far as the southern part of the Peninsula is concerned the western line will be the first to be pushed through to Siam, and a step in this direction was made when on July 4 the last spike was driven on the line linking up Bukit Mertajam and Alor Star. This, of course, does not mean that the line is by any means open to traffic. It is hoped, however, on the first of October to commence traffic up to Pinang Tungal (Muda River) on the boundary between Province Wellesley and Kedah. After that sections will be opened up as they are finished off, until ultimately the whole of the line up to Alor Star is in use, this being most probably accomplished at the end of 1915 or early in 1916.

The length of line from Bukit Mertajam to Alor Star is 56 miles, and it is proposed to link up from Alor Star to the Perlis-Siamese boundary, to meet a line to be built from Ootapao, the nearest point on the completed portions of the Siamese system, which forms, roughly, a triangle between Trang, Tung Sawng

and Singgora. The survey is now being made from Alor Star to the Perlis-Siamese boundary, the portion of the line which will be built by the F. M. S., while the Siamese authorities are doing similar work on the other side of the boundary, the intention being, apparently, to push on this connecting link as soon as possible. It is anticipated that through traffic will be established between Alor Star and Ootapao during 1917, probably towards the end of that year.

The length of the proposed new line between Alor Star and the Siamese boundary is from 40 to 45 miles. The country between Alor Star and Aro is similar to that around Alor Star, consisting mostly of padi fields. From Aro to the boundary it consists of *kebuns* and padi fields, so that the whole of the projected new line is through comparatively easy country. It will cross the boundary at Padang Besar. Between Aro and the boundary the line will run through some particularly beautiful country, consisting of limestone hills like those at Batu Caves. In this district also are the phosphate mines, an industry that will doubtless be considerably helped by the coming of the railway.

To the East, about ten miles from Aro, is Bukit Arang, where the Perlis Government intends to bore for oil, work for which it is now calling for tenders.

The date at which through connection between Bangkok and Singapore is secured will, of course, depend entirely upon the speed with which the Siamese authorities push on their work of filling up the gaps in their main line between Bangkok and Tung Sawng. As to how this work is progressing very little is known in the F. M. S., but an authoritative opinion expressed to us the other day was to the effect that progress was steady, and that the through route might be open some time in 1918.

As to the intentions of the F. M. S. Government with regard to the eastern line, at present open for traffic up to Kuala Tembeling, and under construction up to somewhere in the neighbourhood of Kuala Lipis, no information is available officially, but unofficial news would seem to indicate that the work is being pushed forward.

TRAMWAYS

Shanghai Tramways.—The following is the traffic return of the Shanghai Tramways (Foreign Settlement) for the month of July, 1914, and for seven months ended July 31, 1914, with figures for the corresponding periods last year:—

| | July, 1914. | July, 1913. |
|---|-----------------------------------|-----------------------------------|
| | \$ | \$ |
| Gross receipts | 113,758.87 | 111,342.15 |
| Loss by currency depreciation | 27,998.41 | 24,666.24 |
| Effective receipts | 85,760.46 | 86,675.91 |
| Percentage of loss by currency depreciation | 26.25 | 23.24 |
| Car miles run | 313,684 | 262,808 |
| Passengers carried | 5,058,861 | 4,552,571 |
| | seven months ended July 31, 1914. | seven months ended July 31, 1913. |
| | \$ | \$ |
| Gross receipts | 750,001.81 | 651,139.76 |
| Loss by currency depreciation | 175,279.96 | 141,048.89 |
| Effective receipts | 574,721.85 | 510,090.87 |
| Percentage of loss by currency depreciation | 24.76 | 22.04 |
| Car miles run | 1,915,801 | 1,619,119 |
| Passengers carried | 31,482,225 | 25,897,237 |

Week ended July 29.

| | 1914. | 1913. |
|---|-----------|-----------|
| | \$ | \$ |
| Gross receipts | 24,692.79 | 31,162.71 |
| Loss by currency depreciation | 6,046.28 | 6,975.65 |
| Effective receipts | 18,646.51 | 24,187.06 |
| Percentage of loss by currency depreciation | 26.21 | 23.29 |
| Car miles run | 70,670 | 63,810 |
| Passengers carried | 1,103,838 | 1,248,331 |

Week ended August 5.

| | 1914. | 1913. |
|---|-----------|-----------|
| | \$ | \$ |
| Gross receipts | 24,332.22 | 26,125.90 |
| Loss by currency depreciation | 6,029.43 | 5,917.75 |
| Effective receipts | 18,302.79 | 20,208.15 |
| Percentage of loss by currency depreciation | 26.34 | 23.66 |
| Passengers carried | 1,082,823 | 1,062,236 |
| Car miles run | 69,331 | 59,885 |

Week ended August 12.

| | 1914. | 1913. |
|---|-----------|-----------|
| | \$ | \$ |
| Gross receipts | 26,040.24 | 24,352.42 |
| Loss by currency depreciation | 6,396.67 | 5,582.17 |
| Effective receipts | 19,643.57 | 18,790.25 |
| Percentage of loss by currency depreciation | 26.10 | 23.96 |
| Passengers carried | 1,163,749 | 985,504 |
| Car miles run | 71,076 | 59,200 |

Week ended August 19.

| | 1914. | 1913. |
|---|-----------|-----------|
| | \$ | \$ |
| Gross receipts | 26,664.22 | 24,176.64 |
| Loss by currency depreciation | 6,546.28 | 5,515.98 |
| Effective Receipts | 20,118.34 | 18,660.66 |
| Percentage of loss by currency depreciation | 26.10 | 23.93 |
| Passengers carried | 1,155,293 | 984,227 |
| Car miles run | 74,475 | 59,354 |

Week ended August 26.

| | 1914. | 1913. |
|---|-----------|-----------|
| | \$ | \$ |
| Gross receipts | 25,609.10 | 23,379.63 |
| Loss by currency depreciation | 6,346.82 | 5,425.29 |
| Effective receipts | 19,262.28 | 17,954.43 |
| Percentage of loss by currency depreciation | 26.38 | 24.39 |
| Passengers carried | 1,151,200 | 963,978 |
| Car miles run | 70,349 | 59,321 |

MINING

Kailan Mining Administration.—The total output of the Administration's mines for the week ended July 18, amounted to 57,128.84 tons and the Sales during the same period to 36,948.32 tons.

Week ended July 25, output 58,641.86 tons, sales 57,603.33 tons.

Week ended August 1, output 56,368.96 tons, sales 29,777.79 tons.

Week ended August 8, output 54,292.42 tons, sales 46,269.19 tons.

Week ended August 15, output 45,758.71 tons, sales 55,163.10 tons.

HARBORS, ETC.

The Whangpoo Conservancy.—The dredging away of Footung Point in the Whangpoo River has been begun. It is at present being carried out by contract, but the contract expires shortly and the work will later be carried out by the Conservancy's own plant.

Wonsan Harbor Construction.—The reconstruction of the harbour at Wonsan in Chosen, it is understood, will begin next spring, to be completed in five years at a cost of 1,500,000 yen. The question has been outstanding for many years, and extensive investigations have lately been made to settle it, with the result above stated.

FINANCIAL

Foreign Capital for Japan.—It is reported that the Kyushu Electric Light Company is negotiating with a certain group of London financiers through Messrs. Sale and Frazar of Tokyo for a loan of 3,000,000 yen. It is believed in local business circles that the negotiations will resolve themselves into an issue of debentures in London at very good terms in the near future, as they were started on the personal inspection of the company's plant and business condition by Mr. Sale when he was on a flying visit here. The vernacular press regards the event as significant as heralding the inflow of foreign capital into provincial industrial circles whereas so far the introduction of foreign capital has been limited to the financing of enterprises in Tokyo or Osaka.

The Third Bank, Japan.—At the ordinary general meeting of shareholders the following profit and loss account was passed:—

| | Yen. |
|--------------------------------------|-------------------|
| Net profit for the term | 284,865.87 |
| Brought over from last account | 27,485.31 |
| Total..... | 312,351.18 |
| To be distributed:— | |
| Dividend at 12 per cent. per annum | 261,000.00 |
| Fees for officers | 25,000.00 |
| Carried forward to next account ... | 26,351.18 |

Bank of Chosen.—At the ordinary general meeting of shareholders the following profit and loss account was passed:—

| | Yen. |
|---|-------------------|
| Net profit for the term | 399,328.34 |
| Brought over from last account ... | 37,330.11 |
| Total | 436,658.45 |
| To be distributed as follows: | |
| Loss reserve | 50,000.00 |
| Dividend equalization fund | 8,000.00 |
| Fees for officers and social expenses | 29,900.00 |
| Dividend at 6 per cent. per annum.. | 225,000.00 |
| Secondary dividend at 1 per cent. per annum | 37,500.00 |
| Carried forward to next account... | 88,258.45 |

As will be seen in the account just stated the dividend has been increased to 7 per cent. per annum instead of 6 per cent. as heretofore while at the same time dividend is proposed to be distributed on the Government shares for the first time.

Hongkong and Shanghai Bank.—The following is the report of the Court of Directors:—

The Directors have now to submit to you a general statement of the affairs of the Bank and balance sheet for the half-year ending June 30, 1914.

The net profits for that period, including \$2,067,311.85, balance brought forward from last account, after paying all charges, deducting interest paid and due, and making provision for bad and doubtful accounts and contingencies, amount to \$5,590,084.02.

The Directors recommend the transfer of \$350,000 from the Profit and Loss account to credit of the Silver Reserve Fund, which fund will then stand at \$18,000,000.

They also recommend writing off Bank Premises Account the sum of \$400,000.

After making these Transfers and deducting Remuneration to Directors there remains for appropriation \$4,825,804.02, out of which the Directors recommend the payment of a Dividend of Two Pounds and Three Shillings Sterling per Share, subject to Income Tax, *viz.* £258,000, which at 1/10%, the rate of the day, will absorb \$2,730,795.58.

The Balance \$2,089,008.44 to be carried to New Profit and Loss Account.

A Branch Office of the Bank has been opened at Tsingtau.

The Directors very much regret to have to record the death of their colleague Mr. G. Friesland last March. Mr. E. Goetz having resigned his seat on leaving the Colony, Mr. Ad. Widmann and Mr. F. Lieb were invited to fill these two vacancies. Both these gentlemen as well as Mr. H. A. Siebs and Mr. C. Landgraf have since resigned. Mr. G. T. M. Edkins has been invited to join the Board.

Hypothec Bank of Japan.—The accounts for the last half year are as follow:—

| | Yen. |
|---|---------------------|
| Net profit for the term... .. | 1,413,373.90 |
| Brought over from the last account | 108,150.96 |
| Total | 1,521,524.87 |
| To be distributed: | |
| Reserve funds... .. | 373,000.00 |
| Dividend at 10 per cent. per annum | 955,000.00 |
| Fees for officers | 85,000.00 |
| Carried forward to the next account | 108,524.87 |

At the end of June last the Bank held reserve funds to the extent of 4,303,400 yen against the whole paid-up capital to the extent of 20,000,000 yen. While the accommodation the Bank had given to the general public amounted, up to the end of June, to 194,979,423 yen the mortgage debentures issued to that date reached a total of 164,969,580 yen.

COMPANIES

"Star" Ferry Co., Ltd., (Hongkong).—The report for the year ending April 30, 1914, was as follows:—

The net earnings of the boats, after paying all working expenses, amounted to \$89,066.32 as against \$78,780.46 the previous year.

The amount at credit of profit and loss account (after paying for repairs, allowing for directors' and auditor's fees and placing \$4,615.05 to credit of accident fund), including \$6,795.18 brought forward, is \$94,775.91, which, with the approval of shareholders, it is proposed to appropriate as follows:—

| | |
|---|--------------------|
| To write off Ice House Street Pier | \$6,418.12 |
| To write off boats | 2,301.00 |
| To pay a dividend of \$1.70 per share from working profits..... | 68,000.00 |
| To pay a bonus of 30 cents per share from interest account..... | 12,000.00 |
| To carry forward | 6,056.79 |
| Total | \$94,775.91 |

Keihin (Japan) Electric Tramway Co.—The accounts for the term ended March 31 were adopted as follows:—

| | Yen. |
|------------------------------------|-------------------|
| Net profit for the term | 158,307.94 |
| Brought over from last account .. | 14,284.00 |
| Total | 172,591.98 |
| To be distributed:— | |
| Legal reserve | 8,000.00 |
| Secondary reserve | 8,000.00 |
| Bonuses for auditors and directors | 8,000.00 |
| Dividend at 6 per cent. per annum. | 122,400.00 |
| Carried forward to next account .. | 26,191.98 |

Yokohama Electric Car Co.—At the ordinary general meeting of shareholders of this company the following profit and loss account, was passed:—

| | Yen. |
|--|-------------------|
| Net gains for the term | 172,399.72 |
| Brought over from last term.. .. | 2,353.49 |
| Total | 174,753.21 |
| To be distributed:— | |
| Legal reserve | 8,650.00 |
| Secondary reserve | 8,650.00 |
| Dividend at 8 per cent. per annum. | 40,000.00 |
| Dividend on first new shares at 8 per cent. per annum | 80,000.00 |
| Dividend on second new shares at 8 per cent. per annum | 30,000.00 |
| Fees for officers | 5,000.00 |
| Carried forward to next account .. | 2,453.21 |

Kawasaki Dockyard Co.—At the ordinary general meeting of shareholders of this company the following profit and loss account was passed:—

| | Yen. |
|------------------------------------|----------------|
| Net profit for the term | 629,800 |
| Brought over from last account .. | 41,000 |
| Total | 670,800 |
| To be distributed:— | |
| Reserves | 123,000 |
| Sinking fund | 120,000 |
| Dividend at 8 per cent. | 331,600 |
| Fees for officers | 30,000 |
| Carried forward to next account .. | 67,179 |

Yokohama Warehousing Co.—At the ordinary general meeting of shareholders of this company the following profit and loss account was passed:—

| | Yen. |
|------------------------------------|------------------|
| Net gains for the term | 34,768.65 |
| Brought over from last account .. | 31,997.20 |
| Total | 66,765.85 |
| To be distributed:— | |
| Legal reserve | 1,000.00 |
| Fees for officers | 2,000.00 |
| Dividend at 6 per cent. per annum. | 53,200.00 |
| Carried forward to next account .. | 9,765.85 |

Tokyo Gas and E. I. Co.—At the ordinary general meeting of shareholders of this company the following profit and loss account was passed:—

| | Yen. |
|------------------------------------|------------------|
| Net profit for the term | 20,714.11 |
| Brought over from last account .. | 2,985.34 |
| Total | 23,699.45 |
| To be distributed:— | |
| Legal reserve | 1,100.00 |
| Secondary reserve | 2,150.00 |
| Dividend at 8 per cent. | 16,000.00 |
| Fees for officers | 800.00 |
| Pension reserve | 500.00 |
| Carried forward to next account .. | 3,149.46 |

Osaka Shosen Kaisha.—This company has presented the following profit and loss account:—

| | Yen. |
|---|------------------|
| Net profit for the term | 9,750,000 |
| Less expenditure | 7,010,000 |
| Total | 2,740,000 |
| Brought over from last account .. | 888,000 |
| Total | 3,628,000 |
| To be distributed as follows:— | |
| Sundry reserves | 1,762,000 |
| Dividend at 10 per cent. per annum. | 825,000 |
| Reserve for the equalization of dividends | 500,007 |
| Carried forward to next account .. | 541,000 |

Fuji Minobu Railway Co.—At the fifth ordinary general meeting of the shareholders of this company the meeting passed the following profit and loss account:—

| | |
|-----------------------------------|------------------|
| | Yen. |
| Net profit for the term | 20,580.37 |
| Brought over from last account .. | 688.56 |
| Total | 21,268.93 |

To be distributed as follows:—

| | |
|-------------------------------------|-----------|
| Legal reserve | 1,030.00 |
| Dividend at 5 per cent. per annum.. | 16,703.30 |
| Carried forward to next account .. | 3,555.50 |

Nisshin (Japan) Cotton Spinning Co.—At the ordinary general meeting of shareholders of the Nisshin Cotton Spinning Co. the following profit and loss account was passed.

| | |
|-----------------------------------|-------------------|
| | Yen. |
| Net profit for the term | 62,226.38 |
| Brought over from last account .. | 91,412.33 |
| Total | 153,638.71 |

To be distributed as follows:—

| | |
|--|-----------|
| Legal reserve | 3,201.00 |
| Secondary reserve | 6,500.00 |
| Bonuses for the officers and employees | 5,000.00 |
| Dividend at 5 per cent. per annum. | 88,000.00 |
| Carried forward to next account .. | 50,938.00 |

Yokohama Fire Insurance Co.—At the ordinary general meeting of the Yokohama Fire Insurance Company the following profit and loss account was passed:—

| | |
|---|------------|
| | Yen. |
| Net profit and balance brought over from last account | 358,865.20 |
| To be distributed:— | |
| Legal reserve | 20,000.00 |
| Dividend at 10 per cent. per annum | 162,500.00 |
| Bonuses for auditors and directors. | 12,000.00 |
| Carried forward to next account .. | 164,365.20 |

Fuji Gassed Spinning Co.—At the ordinary general meeting of shareholders of this company the business report together with the following profit and loss account was accepted by the meeting.

| | |
|---------------------------------|---------------------|
| | Yen. |
| Net profit for the term | 1,040,474.48 |
| Brought over from last account. | 958,556.62 |
| Total | 1,999,031.10 |

To be distributed:—

| | |
|-------------------------------------|------------|
| Legal reserve | 52,023.00 |
| Loss reserve | 52,023.00 |
| Bonuses and pensions for operatives | 52,023.00 |
| Bonuses and pensions for employees | 52,023.00 |
| Bonuses for officers.. .. | 52,023.00 |
| Dividend at 12 per cent. per annum | 765,184.00 |
| Carried forward to next account.. | 973,732.10 |

Dai Nippon Sugar Co.—At the ordinary general meeting of shareholders of this company the following profit and loss account was passed:

| | |
|-----------------------------------|---------------------|
| | Yen |
| Net profit for the term | 1,140,138.98 |
| Brought over from last account .. | 530,185.50 |
| Total... .. | 1,670,324.48 |

To be distributed as follows:

| | |
|---|------------|
| Legal reserve | 60,000.00 |
| Secondary reserve | 250,000.00 |
| Sinking fund for the capital aid in the Dairi factory | 250,000.00 |
| Pension reserve | 15,000.00 |
| Bonuses for officers and employees | 85,000.00 |
| Dividend at 8 per cent. per annum | 444,000.00 |
| Carried forward to next account... | 566,324.48 |

Tokyo Electric Light Co.—At the ordinary general meeting of shareholders of this company, the profit and loss account was adopted as follows:

| | |
|-----------------------------------|---------------------|
| Brought over from last account .. | 368,980.77 |
| Net profit for the term | 1,839,232.41 |
| Total | 2,208,213.18 |

To be distributed:

| | |
|------------------------------------|--------------|
| Reserves | 92,000.00 |
| Dividend at 10 per cent per annum | 1,980,000.00 |
| Carried forward to next account... | 136,213.18 |

Tokyo Rice and Products Exchange.—At the ordinary general meeting of the Exchange the following profit and loss account was passed:—

| | |
|-----------------------------------|-------------------|
| | Yen. |
| Net profit for the term | 124,765.28 |
| Brought over from last account .. | 1,278.40 |
| Total | 126,043.68 |

This amount is to be distributed in the following manner:—

| | |
|------------------------------------|------------|
| Loss reserve | 6,350.00 |
| Bonuses for auditors and directors | 6,300.00 |
| Dividend at 10 per cent. per annum | 112,500.00 |
| Carried forward to next account... | 893.68 |

| | |
|--------------------|-------------------|
| Total | 126,043.68 |
|--------------------|-------------------|

China-Japanese Flour Mill Co.—At the ordinary general meeting of this company the accounts for the term ended March 31, and the following profit and loss account were passed:—

| | |
|-----------------------------------|------------------|
| | Yen. |
| Net profit for the term | 64,275.77 |
| Brought over from last account .. | 34,907.45 |
| Total... .. | 99,183.22 |

To be distributed in the following manner:—

| | |
|------------------------------------|-----------|
| Legal reserve | 3,000.00 |
| Loss reserve | 10,000.00 |
| Bonuses | 5,000.00 |
| Dividend at 10 per cent. per annum | 60,400.00 |
| Carried forward to next account... | 20,283.22 |

Fuji Paper Mill Co.—The following is the profit and loss account of this company:—

| | |
|-----------------------------------|----------------|
| | Yen. |
| Net profit for the term | 446,000 |
| Brought over from last account .. | 120,000 |
| Total... .. | 566,000 |

Sinking funds 60,000

Balance 506,000

To be distributed in the following manner:—

| | |
|------------------------------------|---------|
| Reserves | 38,600 |
| Bonuses and social expenses... | 27,000 |
| Pension reserve... .. | 7,700 |
| Dividend at 9 per cent. per annum | 309,500 |
| Carried forward to next account... | 123,200 |

Tokyo Stock Exchange.—The accounts for the term ended March 31 were adopted at a recent general meeting as follow:—

| | |
|--------------------------------|-------------------|
| | Yen |
| Net gains for the term | 479,294.25 |
| Brought over from last account | 7,252.39 |
| Total | 486,546.64 |

To be distributed:

| | |
|---|------------|
| Loss reserve | 24,000.00 |
| Secondary reserve | 10,000.00 |
| Sinking fund for office building expenditures | 4,000.00 |
| Dividend at 11½ per cent. per annum | 448,000.00 |
| Carried forward to next account | 546.64 |

Kinugawa Electric Co.—At the ordinary general meeting of shareholders of this company the following profit and loss account was passed:—

| | |
|-----------------------------------|----------------|
| | Yen |
| Net profit for the term | 405,051 |
| Brought over from last account... | 29,366 |
| Total | 434,417 |

To be distributed as follow:

| | |
|----------------------------------|--------|
| Legal reserve | 21,000 |
| Loss supplementary reserve | 21,000 |

| | |
|---|---------|
| Bonuses for officials and employees | 20,000 |
| Dividend at 7 per cent. per annum | 356,400 |
| Carried forward to next account | 16,014 |

Teikoku Hemp Weaving Co.—At the ordinary general meeting of shareholders the following profit and loss account was passed:—

| | |
|-----------------------------------|-------------------|
| | Yen. |
| Net gains for the term | 372,724.53 |
| Brought over from last account .. | 24,839.04 |
| Total | 397,563.57 |

To be distributed:—

| | |
|--|------------|
| Legal reserve | 20,000.00 |
| Secondary reserve | 40,000.00 |
| Dividend on old shares at 12 per cent. per annum | 192,000.00 |
| Dividend on new shares at 12 per cent. per annum | 104,000.00 |
| Bonuses | 20,000.00 |
| Carried forward to next account ... | 21,563.57 |

Dai Nippon Brewery.—This Company's profit and loss account for the last six months was as follows:—

| | |
|-----------------------------------|---------------------|
| | Yen. |
| Net profit for the term | 630,534.69 |
| Brought over from last account .. | 471,555.57 |
| Total | 1,102,090.26 |

To be distributed:—

| | |
|-------------------------------------|------------|
| Legal reserve | 35,000.00 |
| Fees for officers | 31,626.73 |
| Dividend at 12 per cent. per annum | 451,200.00 |
| Secondary dividend | 75,200.00 |
| Bonuses for employees | 25,000.00 |
| Carried forward to next account ... | 484,163.33 |

Kanegafuchi Spinning Co.—This Company's profit and loss account was as follows:—

| | |
|-----------------------------------|---------------------|
| | Yen. |
| Net gains for the half year | 1,823,249.74 |
| Brought over from last account .. | 1,842,259.21 |
| Total | 3,665,508.95 |

| | |
|---|--------------|
| Dividend at 12 per cent. per annum | 897,997.80 |
| Special dividend at 4 per cent. per annum | 299,332.60 |
| Reserves | 150,000.00 |
| Pension reserve... .. | 100,000.00 |
| Fund for the promotion of operatives' happiness | 100,000.00 |
| Bonus for officers | 80,000.00 |
| Carried forward to next account ... | 2,038,178.55 |

Tokyo Fire Insurance Co.—At the ordinary general meeting of shareholders the following profit and loss account was passed:—

| | |
|--|------------|
| | Yen. |
| Net gains for the half year and balance brought over from last account | 468,993.01 |
| Legal reserve | 25,000.00 |
| Emergency reserve | 144,164.32 |
| Fees for officers and social expenses | 15,000.00 |
| Pension reserve... .. | 10,000.00 |
| Dividend at 8 per cent. per annum | 200,000.00 |
| Carried forward to next account... | 74,828.68 |

Tokyo Sugar Manufacturing Co.—At the ordinary general meeting of shareholders the following profit and loss account was passed:—

| | |
|--------------------------------------|-------------------|
| | Yen. |
| Net Profit for the term | 381,919.64 |
| Brought over from last account | 64,453.76 |
| Total | 446,373.40 |

To be distributed:—

| | |
|--|------------|
| Legal reserve..... | 20,000.00 |
| Fund for depreciation in fixtures and plant..... | 20,000.00 |
| Fees for officers and social expenses | 27,000.00 |
| Dividend at 10 per cent. per annum | 350,000.00 |
| Carried forward to next account ... | 19,373.40 |

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Ynchausti & Co.

Shipping Agents

Cia. General de Tabacos
Shewan, Tomes & Co.
Stevenson & Co., Ltd.

Shipbuilding and Repairs

Flat-san Giorgio Ltd.
Tsingtau Werft
Hongkong & Whampoa Dock Co., Ltd.
Mitsu Bishi Dock and Engineering Works
Shanghai Dock and Engineering Co., Ltd.
The Talkoo Dockyard and Engineering Company of Hongkong, Limited

Steamship Companies

Cia. General de Tabacos
Pacific Mail S. S. Co.
Ynchausti & Co.
Toyo Kisen Kaisha.

Steel Manufacturers

United States Steel Products Export Co.

Steel Works

Bohler Bros. & Co., Ltd.
U. S. Steel Products Co.

Stokers

Babcock & Wilcox Ltd.

Structural Steel

Bohler Bros. & Co.
Shanghai Dock & Engineering Co., Ltd.
U. S. Steel Products Co.

Sugar Machinery

A. F. Craig & Co.

Superheaters

Babcock & Wilcox Ltd.

Tanks

Pacific Tank and Pipe Co.
Shanghai Dock & Engineering Co., Ltd.
U. S. Steel Products Co.
A. F. Craig & Co.

Telephones

The Western Electric Co.

Textile Machinery

A. F. Craig & Co.

Tiles and Bricks

Green Island Cement Co., Ltd.
Chinese Eng. Mining Co.

Tobacco Dealers

British-American Tobacco Co., Ltd.
Cia. General de Tabacos
Olsen & Co., Walter E.

Tools

American Tool Works Co.
Lodge & Shipley Machine Tool Co.
Shanghai Machine Co.
Shanghai Dock & Engineering Co., Ltd.

Windmills

Defiance Machine Works.

Water Softeners

Babcock & Wilcox Ltd.

Wood Working Machinery

American Tool Works Co.
Defiance Machine Works.
Lodge & Shipley Machine Tool Co.
Shanghai Dock & Engineering Co., Ltd.